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JOURNAL
OF THE
American Veterinary Medical
Association

FORMERLY
AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet. Med. Ass'n)

EDITED AND PUBLISHED FOR
The American Veterinary Medical Association

BY
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JOURNAL OF THE American Veterinary Medical Association

FORMERLY AMERICAN VETERINARY REVIEW

(Original Official Organ U. S. Vet'y Med. Assoc.)

OCTOBER, 1915.

EDITORIAL.

IMPORTANT ANNOUNCEMENT—REVIEW BECOMES OFFICIAL ORGAN OF AMERICAN VETERINARY MEDICAL ASSOCIATION.

Exercising the power vested in it at the Oakland meeting of the American Veterinary Medical Association, to establish an official organ of the association—either by the creation of a new journal or the acquirement of an already established one—the Committee on Journal, through its sub-committee, has purchased the AMERICAN VETERINARY REVIEW, and has selected as editor of the official organ Pierre A. Fish, of Ithaca, N. Y., who is preparing to assume the duties of this important position at the earliest moment consistent with the many details incident to such a step. We therefore take this opportunity of expressing our appreciation to our large family of readers and loyal supporters during the many years in the past in which their subscriptions, literary contributions and kind words of encouragement have helped us to put forth our best efforts, often under great stress, and not infrequently when our health has not been of the best, and to assure them that their old monthly visitor, under a new name, will continue to reach them regularly as heretofore. We regret that time will not permit of an expression from Dr. Liautard to the readers of the REVIEW (to whom he has given so

unstintingly of his time and his talent for the past forty years), reaching us in time for this issue, but it will be just as welcome in the next. In conclusion, we wish to congratulate the American Veterinary Medical Association in having been able to retain the services of so splendid and so excellent a man to edit the official organ of the national veterinary body, as their very efficient committee has been able to secure in the person of Dr. Fish, which will insure to its readers a continuance of the high ethical standing and high ideals which they have so much appreciated in the AMERICAN VETERINARY REVIEW during our long years of association.

Dr. Fish's acceptance of this responsible office follows in a brief statement from his pen:

"Through the action of the American Veterinary Medical Association at its Oakland meeting, the writer has subsequently been honored with the position of editor of the journal which is to replace the former proceedings of the association. Since the editorship has only just been arranged and numerous details remain to be attended to, it is difficult to make a positive statement as to when the new management will assume complete responsibility. In the meantime, if there should be unavoidable delays, Dr. Ellis has very kindly promised to continue his co-operation so that there may be no break in the continuity of the monthly issues. At this time the writer wishes to express his profound appreciation of the honor that has come to him; to ask for co-operation from each and every member; to express the hope that the journal will increase our community of interest, as well as the membership of the association, and that there may be unity and progress for the future.

P. A. FISH."

September 25, 1915.

EUROPEAN CHRONICLES.

BOIS JEROME, 15th Sept., 1915.

AMONGST A FEW OF OUR EXCHANGES. In the *Clinica Veterinaria*, that excellent contemporary Prof. N. Lanzillotti Buon-

santi has published for a number of years, the number of July 1915 calls attention to the conclusion of an article by Prof. Matteo Carpano on the *Fever of the Mediterranean coasts* or the *piroplasmosis of bovines* with the organism *Theilera parva*. The entire subject is treated by the author very extensively, and is illustrated by plates showing the various developments of the germs. The means of transmission by the natural infection through the tick, *Hyalomma Egyptium* as well as the experimental transmission through infected blood is followed by a general consideration on the pathogeny of the disease and in which are then examined the triple pathogenic action that takes place, viz.: the general, due to the toxines produced, the direct upon the cells of the organism and specially the endothelium of the nasal walls and the direct action upon the red globules of the blood. The diagnosis is an important question as other diseases may be mistaken with the piroplasmosis, as anthrax ematica, hemorrhagic septicemia, bovine pest, exudative pleuropneumonia and the piroplasmosis of the Bigeminum. While however the macroscopic diagnosis can be made, it is essential to have recourse to the microscopic, specially in suspicious cases. The prognosis, treatment and prophylaxis complete the excellent work of Prof. Carpano with a long bibliographic notice.

* *

An article on Swine pest by Prof. P. Stazzi and one on the diarrhea of calves by Dr. P. Scatti complete the series of original articles of this issue of our Italian contemporary.

* *

Prof. F. Hobday, as every one knows, is at his post at the front, and yet his *Veterinary Journal* comes out regularly and always is full of interesting articles.

The August number gives first the likeness of one of our poor English confrères who was killed whilst on active service in the Dardanelles, and after paying its condolences to him, the Journal presents its general articles.

First comes a preliminary note upon the *intra-dermal palpebral method of mallein testing for glanders*.

In a recent chronicle I have already called the attention of our readers to this new method invented and patronized by Prof. Drouin, who has applied it very extensively in Greece and in the French army, with such satisfactory results that there can exist no doubt as to the admission of the procedure as the very best and simplest to have recourse to. In the article of the Journal, a number of illustrations shows the various stages of the manifestations, which concord perfectly with the description that I have given already.

*
* *

This is followed by an article on the use of polyvalent serum of Leclainche & Vallee, with which I have also made our American readers acquainted as taken from the *Revue Panisset*. The official instructions issued for the use of this valuable serum in the dressing of wounds read as follows.

This serum, produced by horses immunized against the organisms of diverse suppurations (staphylococci, stryptococci, coli bacilli, pyocianic bacilli, etc.) and of gazeous gangrene, (vibron, septic, B. perfringens), according to the method of Leclainche and Vallee, possesses at the same time the advantages recognized in normal serum and those which result from the presence of specific antitoxics.

By its physiological qualities, the serum forms on wounds and inflamed mucosa an isolating layer, and constitutes an occasional medium eminently favorable to the rapid regeneration of anatomical elements to the success of grafting, to the safeguard and regeneration of cutaneous flaps, muscular or mutilated organs (fingers, toes), which, without it, would require excision. It is a precious and incomparable help to conservative surgery. It diminishes pain and causes it to disappear (extensive wounds, burns).

By its specific properties, the polyvalent serum ensures the

phagocytosis of organisms; it modifies rapidly, then dries up suppuration or hinders its development; by its action on anaerobes and microbes that favor their multiplication, it avoids indirectly the formidable complications of gaseous gangrene.

In contradiction to antiseptics which paralyse and coagulate at the same time the microbe and the cells of the tissues, the serum protects the latter and affects the microbe only.

Employed in dressing of infected wounds, it realizes a physiological antiseptism expressed by immediate modification of suppuration and its progressive disappearance, followed by a hasty cicatrization.

Used as washings and dressings as a preventive in surgical operations susceptible to post-operative complications (soiled or infected serosa, progressive gangrene), it brings about normal repair of the lesion.

MODES OF USE. The employment of the serum, *exclusive of all other antiseptic medication*, is carried out as follows:

(1) Practise a complete lavage of the surfaces to be treated with a boiled, lukewarm solution of sodium chloride 9 p.1000 in water, distilled for preference.

(2) According to the case, apply on the wound layers of simple sterilized gauze soaked in serum, or introduce a tampon, soaked in serum into the fistulous tracts or cavities or inject the serum without dilution.

(3) Apply a dry protective dressing.

(4) Renew the dressing of polyvalent serum as often as necessary and according to the indications of each case. Prolonged use of the serum does not lead to any anaphylactic or other accident.

(5) Each flask issued, or ampoule opened, needs to be used immediately. Only contradiction, cerebral surgery.

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Among the original articles of this issue of the *Veterinary Journal*, there is one from Dr. Walter Stapley, M.R.C.V.S., M.D., D.V.Sc., on the—

MAMMALIAN COECUM. "That academic authorities have stated that bears have lost the coecum by retrogressive changes, that the double coecum of birds is fit for direct comparison with the mammalian coecum and that the vermiform appendix is a lymph gland and not a vestige of the coecum of ancestral man, is to be regretted; for not only do these erroneous statements serve to confuse the history of the coecum, but they divert the study of the subject from its proper sphere, the consideration of the differentiation of the simple gut into small intestines and large bowels."

And with the opening of the subject, the author writes a very interesting discussion, where the names of scientists and anatomists are brought forward, such as those of Dr. Arthur Keith, John Hunter, Prof. Berry, Owen, etc.

The conclusions arrived at by the author seem to us to be that: "The formation of the vermiform appendix depends entirely upon the manner the external muscle tears when subjected to pressure from within. . . . Finally there has been too much nonsense talked about the evolution of the coecum; these processes can only be followed by the forces that built up this organ. It is profitless to discuss the matter of gemmules, chromosomes or hormones, for all these things must ever be reduced to the energies that established them in the first instance. The physical side of comparative anatomy is a much neglected subject."

Still it is a fact that many mammalias have an appendix and also a number of them have not. Even in the first instance there is no general agreement. Its presence is accepted with some animals by some anatomists and denied by others.

At any rate the subject as treated by Dr. Stapley contains much interest.

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The *Bulletins de la Société Centrale* were among our missing exchanges one that we regretted the most. Recording monthly as they do the work done by the Société, they stopped their publication last year, at the time of the general mobilization in

France. They have just made their reappearance with date of 1914—those which will follow will bear the date 1915, in that way the volume will be completed.

In this number are recorded the two meetings that were held in July 1914. The first records principally a case of rather important interest, viz. the *application of hot air in the treatment of paraplegia*. The second sitting was entirely occupied by the reports of the various committees for the several prizes which are given by the Society. There were the reports on the papers offered for the general competition of 1914, that of 1200 fs. of the Pamgouè prize, that of 1600 fs. of the Trashed prize, that of 600 francs of the Urbain Leblanc prize, that of 500 fs. of the Weber prize, and finally the report of the Committee on prizes for papers which were brought to its attention as they were presented at the meetings during the year.

It is unnecessary to give a list and the titles of the subjects which were treated and presented by the competitors, but be sure that if they were not so numerous, they were at least of great value from a scientific point of view.

This distribution of prizes has always been regarded by us as a very good move on the part of any association. Several medical Societies in the States have them or at least used to years ago. And it has appeared to our ideas that the A. V. M. Assoc. would add a great deal to the interest offered to the yearly general gathering. Of course the association does not need this to obtain material for discussion at its meetings, but we feel that it would prove a great inducement and a source of no small self pride for those who would be victorious in their attempt to get a coveted prize.

Perhaps the association has no funds to dispose of in granting such, and pecuniary prizes would not have in the eyes of our confrères the same value as a gold, silver or even bronze medal. But if the thing were considered and entertained by the association there is no doubt that generous legacies would by degrees be given which would compare favorably with those I have alluded to in the consideration of the prizes granted by the Société Centrale.

The question may be worthy of the consideration of our association and the creation and nomination of a committee on prizes be the object of a decision of this great national organization.

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AMERICAN CHRONICLE. I hope my readers will pardon me this change of denomination in my capacity of chronicler. But how can I do otherwise when I have before me American reproductions which I cannot help but consider as addressed to the Chronicler more than to the Editor himself.

Some while ago I received the *Report of the N. Y. State Veterinary College* at Cornell University, for the year 1913-14—as transmitted by the President, Jacob Gould Schurman.

When an institution is requested by law to publish yearly a report of its work to the Government of its State, and such report is distributed to parties interested, it may happen that the one who receives it regularly, punctually almost every year, is tempted to say after glancing at the title page of the pamphlet, "Well, I suppose it is the same as last year," and on that the said pamphlet is put aside for further and later (??) consideration. The one who does that for this new report from Cornell University would make a great mistake and deprive himself of most interesting and valuable information.

Of course the report is about the same as those which have preceded here, but the arrangements are very different. And if the general report of the Director merely lays down the progress that was made, that differs from that of years before, and one cannot but be interested in the advancements that are shown to have taken place.

But with this part of the report which may be considered as the "General survey of the condition and operations of the College," there is a second part which "contains the statements supplementing this general survey by the different professors describing the principal scientific investigations in which they

and their associates have been engaged." Glance at the appendix, at the report of the surgical, of the ambulatory, of the medical and of small animal clinic and then the reader will be brought to the scientific records made by Prof. D. H. Udall on the diagnosis of open cases of tuberculosis, by Prof. R. R. Birch on Hog Cholera transmission, by Prof. W. L. Williams on Contagious abortion in cattle, on the cause, prevention and treatment of retained placenta in the cow, on an improved technic for the handling of fistulous withers; by Prof. C. P. Fitch on Septicemic hemorrhagica among cattle, on a review of the principal methods used to standardize bacterins with special reference to the use of the hemocytometer; by Prof. E. M. Pickens on Tuberculosis in pheasants and a cysto adenoma on a fowl, etc., etc.

Many of these papers found in the Report are reprinted and have had previous publications but distributed among veterinarians as they will be by the Report, the benefit that will be obtained will be very great. In that as in many other ways, the report of the State Veterinary College at Ithaca, besides showing the amount of work done by the institution, does much good for all those who may read it.

The Cornell Veterinarian is not visiting me as regularly as I should like to see it coming. Number 2 of Volume V July 1915 has only arrived. It contains *Editorials; a preliminary report on the recognition of Steam fever or infectious anhemia in N.Y. State, a case of premature birth, some relations of anatomy to Physical diagnosis and Surgery, a case of Erosive Osteo-arthritis in a calf, on being Something more than a Veterinarian.*

If one bears in mind that Prof. P. A. Fish is the Editor and that the contents of the July number are signed by Dr. Udall, Fitch, Danforth, Septimus Sisson, S. A. Goldberg and Arthur Hughes and is told besides that the illustrations referring to the contents are handsome and correct, one can appreciate the value of this number of the *Cornell Veterinarian*.

The attentive reading of the pages of this journal and of the pages of other bulletins which are published in the States and

find at times their way in my office, has often led me to a conclusion which I think would prove beneficial to *all* the veterinarians throughout the country—viz. to the creation in the REVIEW of special pages to review concisely all the clinical reports that may find their way in other publications whose circulation only permits a limited spreading of such reports. I am sure for instance that an analysis of the Premature Birth of Danforth and that of Erosive Osteo-Arthritis in a Calf by Goldberg would prove interesting to all.

The great and I fancied most valuable item in a medical paper, veterinary or human, is beyond the purely scientific part, the spreading of all the *clinical cases* that can be found and are worthy of interest and deserving of credit. Often the busy practitioner will read them and ignore the others. I have for years endeavored to realize this with my European exchanges, I should think if it was done with our American contemporaries, no one would complain.

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BIBLIOGRAPHIC ITEMS. I have received the June quarterly, Alpha Psi, No. 2 of Vol. I, and also three numbers of *Helpful Hints for the Veterinarian* published by Abbott Alkaloid Company of Chicago.

A. L.

A GLIMPSE AT THE TRANSCONTINENTAL TRIP AND THE OAKLAND MEETING.

Before referring to the meeting proper, we will take our readers with us over the beautiful scenic route that we have described to them in several of the pre-convention numbers, and give them a few glimpses of the beautiful moving picture that was unfolded to those who journeyed to the convention city on the American Veterinary Medical Association Special Train from Chicago. We would say in the beginning that as there were not sufficient reservations made by A. V. M. A. members to run out an entire train especially for them, a Greek letter society with

nearly as many members as there were veterinarians, and a few dentists, made up the required number, and in that way a special was arranged for and run from Chicago to Oakland. Leaving Chicago in their berths at 11 p. m. of August 24, our members awoke the next morning to find themselves traversing the fertile Mississippi and Missouri River Valleys. Crossing the rich agricultural states of Iowa and Nebraska, everyone was impressed by the immense grain crops, and equally surprised to see the sheaves of wheat standing in little shocks for miles and miles; some of it having stood long enough for a new growth of several inches to have sprung up—due to the continuous rain which had not permitted it to dry sufficiently for threshing. During the second night the train ascended the eastern foot hill slope of the Rockies, so that early the following morning our party found themselves in the city of Denver, the mile-high metropolis of the Rockies. An unexpected treat awaited them at this place—a tour of the city in sight seeing automobiles not included in the original itinerary. This tour included the public buildings and residential districts, the public parks and zoological gardens, and was greatly enjoyed by all. From Denver our train proceeded to Colorado Springs (seventy-five miles south, but 800 feet higher) reaching there about noon, the train was parked and the day given to pleasure seeking. This place had many attractions. Pike's Peak in the distance attracted some, while the Pike's Peak region, including a visit to Manitou nestled in the bosom of the Rockies, famous for its soda, iron and sulphur springs, an auto trip to Crystal Park 9,000 feet high by narrow tortuous roads up the face of the Rockies—requiring about four hours for the ascent and descent—furnished all the thrills desired by the most daring spirits. Another thrilling auto or carriage trip is that from Manitou to the Cave of the Winds, passing through Williams' Canyon and, like the trip to Crystal Park, but less high, by a narrow ledge road up the side of a part of the Pike's Peak region of the Rockies. The cave when reached was most interesting and instructive. Its many halls each of distinct character in decorative effect, compels man to take off

his hat to nature's handiwork. The Garden of the Gods with its grotesque formations of rocks was also of especial interest. Returning to Colorado Springs in the evening from the various trips of their fancy, the party spent the evening seeing the place, attending the theatre or listening to the excellent orchestra in the park; returning finally to the Pullmans and retiring. Some time early in the morning our train pulled out of Colorado Springs, so that every hour of daylight might be spent in the Rockies. Soon after breakfast the Royal Gorge was reached, which we attempted to describe in previous issues from reports, but having seen it, feel that it is too splendid, too grand and too awe-inspiring for words; also impressing one with the great accomplishments of modern engineering. Having passed through the Royal Gorge, still with a panorama of fascinating mountain scenery before us, we come to the "Tennessee Pass," 10,240 feet high, which is the dividing line between the Atlantic and Pacific slopes. Our train halted at this point for a few moments, at the mouth of a tunnel, where a large coal mining plant is located. Passing through this tunnel—which is half a mile in length—we emerged from its western portal, which opens upon the Pacific slope. East of this point, the rivers and streams had been flowing toward the Atlantic; in the opposite direction to that in which our train was traveling; but as soon as we passed through its western portal, we observed the streams flowing with us, down the Pacific slope toward the Pacific. In the afternoon of this day our train reached Glenwood Springs, a beautiful little spot with shady park walks, warm sulphur baths and flowing hot sulphur springs. A stop was made at this place long enough for those who desired, to indulge themselves either in a bath or a walk through the grounds and in drinking the famous hot sulphur water, for which is claimed medicinal properties that will cure rheumatism and skin troubles. We then proceeded through the Grand River Valley fruit section, finally reaching Salt Lake City Saturday morning, where a trip through this interesting historical city was made in sight-seeing automobiles, and a visit to the auditorium was made in time for the organ

recital—12 to 1 p. m.—on the most wonderful organ in the world—the human voice being reproduced during the exercise. Leaving Salt Lake City on the Western Pacific, passing on trestle over a large portion of the great Salt Lake, and over miles of salt bed, succeeded by miles of desert as white and level as a dining table, through which we traversed the entire night. We entered the famous Feather River Canyon early on Sunday morning. This wonderful route through the Sierra Nevada Mountains, 90 miles in length, in which the road is laid on shelves cut out of the solid rock on the side of the Feather River, which alternates between placid stream and swirling rapids, is not only intensely interesting because of its scenic beauty, but also because of the fact that it passes through mile after mile of gold fields; hundreds of openings in the side of the mountain close to the river-edge, where gold ore was being taken out and washed—or “panned” in miner’s parlance—were in clear view of our party from the train windows. As our train emerged from the western end of this canyon,—at which point is located the largest gold dredging district in the world—we came upon the little town of Oroville at the edge of the fertile Sacramento Valley. A stop of a few minutes was made at this place and a large number of our party alighted, but finding the heat unusual—to some of them at least—soon returned to their cars. Inquiry from an inhabitant elicited the information that the thermometer registered 104 at that point and 115 further down the valley. From this point we proceeded to Sacramento, where we were met by Dr. P. H. Browning, who had come down from San Francisco to bid us welcome in behalf of the California State Veterinary Medical Association. Dr. Browning requested the entire party to come to one end of the station platform, where he had a mysterious looking canvas covered object. On throwing back the canvas he revealed the presence of sixty baskets of fruit, which he told the party to appropriate and take aboard the train. Soon after boarding the train, we were invited to go into the baggage car, where a few barrels of ice cream were at our disposal, donated we understood, by the cattle men of Sacramento. After

the ride between Oroville and Sacramento—the hottest valley we passed through on our entire trip, the fruit and cream were very grateful to our palates. We passed out in the San Joaquin Valley and reached Oakland about 7 p. m., where we were met by a number of automobiles and taken to the beautiful Hotel Oakland; which we are sure our party found to be one of the pleasantest and in every way most satisfactory A. V. M. A. headquarters.

Monday morning found members from the four points of the compass bustling about the hotel office, shaking hands, renewing and making acquaintances. The registration and secretary's office during the opening morning was just outside the large ballroom on the main floor, in which the opening and general sessions were held, and soon proved a popular point of congregation, for registration, receiving of badges, etc., prior to the opening session at 10 a. m., when President Marshall formally declared the fifty-second annual meeting open and introduced Mr. H. C. Capwell of the Chamber of Commerce of Oakland who welcomed the association to Oakland and to California in a very happy strain and was responded to by Dr. J. G. Rutherford in his own inimicable style. Dr. Marshall then delivered the annual address, which summarized matters of interest and importance to the organization and to the American veterinary profession in a most interesting and comprehensive manner.* The general sessions were held each morning and on Monday evening in the ballroom on the first floor where the opening session was held, until Thursday morning, when it was held in Maple Hall just across the way, where it was also held on Thursday evening for the election of officers. On Friday morning a general session was held in the Hall of Congress, in the Panama-Pacific International Exposition grounds; where, immediately following the formal opening by President Marshall, a splendid address was made by Mr. D. O. Lively, in charge of the Live Stock exhibit at the fair, in which he expressed his appreciation and that of the

* See first section of official report of American Veterinary Medical Association, beginning on page 75.

Live Stock men in general, of the work and accomplishments in the interest of the live stock industry by the veterinary profession, and, on concluding his address, presented the organization with a bronze medal. The address and presentation was responded to in a masterly manner, by Dr. V. A. Moore of New York. The installation of officers for 1915-16 then took place in this hall, when the following gentlemen were escorted to their respective stations: President, Dr. R. A. Archibald, California; First Vice-President, Dr. V. A. Moore, New York; Second Vice-President, Dr. Robt. W. Ellis, New York; Third Vice-President, Dr. A. Eichhorn, District of Columbia; Fourth Vice-President,



Dr. C. D. McGilvray, Canada; Fifth Vice-President, Dr. Geo. H. Hart, California; Secretary, Dr. C. M. Haring, California, and Treasurer, Dr. F. H. Schneider, Pennsylvania. This ceremony being completed, we were taken to the Presidio grounds to witness a cavalry drill which had been arranged especially for the A. V. M. A. party, and was fully appreciated by them. After this most excellent exhibition on the Presidio grounds, the A. V. M. A. party returned to the exposition grounds and dispersed to enjoy the fair in their several ways, the meeting in the Hall of Congress being the last session of the 1915 meeting. The section work was conducted in several different rooms in the hotel in the afternoons, and also in Maple Hall. On Tuesday evening a reception and dance was given in the ballroom of the Hotel

Oakland, during which some excellent vocal selections were rendered and some rare music on the bagpipe given; the performer being in costume. On Wednesday evening a banquet was held also at the Oakland at which some features entirely different from any we have seen at former banquets were introduced. It was a great success. The ladies attended the opening session on Monday morning, and were then taken charge of by the local committee of ladies, who exerted every effort to see that they were entertained; a ride through the residential districts of Oakland and Berkeley, a visit to the University and the Greek theatre at that place, where an address was given by ex-President Taft, and the Panama-Pacific International Exposition at San Francisco, naturally being the chief attractions. The latter has some features that are strictly peculiar to the present. We refer to the little trains of cars that run through the exposition grounds without tracks that can be boarded anywhere and will carry you from one end of the grounds to the other for a small fare. Another is the electric wheel chair in which two or three people can ride (one driving) anywhere where a person can walk except inside the buildings. By removing the "plug" and putting it in the pocket the chair is safely left outside of any building for any length of time. These conveniences are great time savers and materially lessen fatigue, two important features in connection with large expositions.

The most convincing evidence of the success of the Oakland meeting, was the reluctance with which the A. V. M. A. members, their families and friends left the city after the meeting closed. But they finally got away. That is away from Oakland, but not from California. If you went to San Francisco, you found some of them there; if you went to Los Angeles you found some of them there; and if you went to San Diego you found them there. This last mentioned city is a surprise to most of us visiting it for the first time; being an up-to-date little city with fine hotels and everything first class. The fair at San Diego is a gem. That is not an original expression as applied to that fair, but just fits it. It is one of the most beautifully laid

out places that can be conceived of; beautifully cared for and its buildings of the very highest class in appearance. Some of our members even went into Mexico before turning homeward, and had the unique experience of visiting a country fair in a small Mexican village. About two hundred and fifty new members were elected at the Oakland meeting.

THE ANNUAL MEETING OF THE GEORGIA STATE VETERINARY ASSOCIATION will be held at Macon, Ga., October 26 and 27, 1915.

DR. O'NEAL RECOVERING FROM ATTACK OF ANTHRAX.—A. V. M. A. members who remember the genial countenance of Dr. W. R. O'Neal at the Oakland meeting will be glad to learn that the good doctor is making a very satisfactory recovery from a recent attack of anthrax, and hopes soon to be as well as ever. Dr. O'Neal lives at Newman, Cal.

VETERINARIANS ORGANIZE: PRACTITIONERS IN AND NEAR WICHITA FORM ASSOCIATION.—The Arkansas Valley Veterinary Medical Association, a society formed for the purpose of promoting the interests of veterinary practitioners within a radius of fifty miles of Wichita, was organized at a meeting in Wichita last night. A membership of nearly forty was carried on the rolls of the association when it met to elect officers at the court house. Officers elected are: Dr. B. F. Houston, Sedgwick, president; Dr. G. M. Predmore, Wichita, vice-president, and Dr. F. L. Marney, Wichita, secretary and treasurer. The association will hold semi-annual meetings.—Wichita, Kan., *Eagle*, August 26, 1915.

ALUMNI MEETING, NEW YORK STATE VETERINARY COLLEGE, AT NEW YORK UNIVERSITY.—In the absence of the president and vice-president, Robert W. Ellis ('89), chairman of the executive committee, called a meeting of the alumni of the above-named school (which includes graduates from the New York College of Veterinary Surgeons, American Veterinary College, New York-American Veterinary College and the present New York State Veterinary College at New York University) at the Hotel Oakland, Oakland, Cal., on the evening of August 31, 1915. Oscar J. Kron, of San Francisco, acted as secretary, and a very interesting meeting was held. A number of states were represented, and a greater activity amongst the alumni throughout the country is anticipated in the future.

ORIGINAL ARTICLES.

SUPPURATIVE LESIONS IN HORSES AND A CALF OF CALIFORNIA DUE TO THE DIPHTHEROID BACILLUS OF PREISZ-NOCARD.*

BY IVAN C. HALL AND CARL W. FISHER, BERKELEY, CAL.

One of us (C. W. F.) has frequently during the fall months of twelve years practice in San Mateo County, observed clinically recognizable abscesses, usually of the pectoral region of horses, and Dr. Chas. Keane, State Veterinarian of California, stated recently in reply to our enquiry, that he had seen some seventeen years ago many horses so afflicted, in certain instances several animals of one ranch or in one stable. The disease appears to be less prevalent here than formerly, but we suspect it to be widespread.

That suppurative infections due to B. Preisz-Nocard are benign and yield so readily to simple surgical treatment accounts for the lack of attention they have received at the hands of investigators in this country. It is important to recognize these lesions, not as having serious consequences in themselves aside from the loss of time, since they are rarely fatal, but rather because a superficial resemblance to farcy in the horse coupled with marked orchitis in male cavies injected with pus make confusion with glanders a distinct possibility. It is equally necessary to distinguish epizootic lymphangitis and sporotrichosis which are etiologically distinct from ulcerative or suppurative lymphangitis, for which, however, bacteriological differentiation offers few obstacles.

The necessity of bacteriological diagnosis has been emphasized recently in two articles by Dr. K. F. Meyer, which elucidate the hitherto somewhat perplexed question of geographical dis-

* From The Cutter Biological Laboratories, Berkeley, California.

tribution of epizootic lymphangitis and sporotrichosis. Dr. Meyer was kind enough to allow us to inspect these manuscripts (1) previous to publication, for which privilege our sincere thanks are due. Therein it is shown that epizootic lymphangitis of equines in certain tropical and subtropical countries, particularly South Africa, Algeria and Jamaica, is due to a blastomycete the *cryptococcus farciminosus*. This is likely the disease observed by Moore (2) in India and by Sewartzkoff (3) in the Philippines. The existence of epizootic lymphangitis in the United States is disputed. On the other hand Meyer recognizes the mycotic lymphangitis of Mohler (4) as sporotrichosis due to *Sporothrix Schencki-Beurmanni*. According to Meyer the pus from cases of true epizootic lymphangitis contains many of the refractile yeast-like bodies of the *cryptococcus farciminosus* which up to the present time have resisted all attempts at artificial cultivation. In equine sporotrichosis however the pus contains few organisms, demonstrable only after prolonged search; yet cultures may be obtained readily.

In comparison to these the pus collected from our cases, and as noted by European observers in ulcerative lymphangitis, contains bacilli in such numbers as to be readily demonstrable microscopically and in addition cultures are secured easily.

HISTORICAL.

Caseous lymphadenitis of sheep was discovered in California and elsewhere in the United States by Norgaard and Mohler (5) as early as 1899, but ulcerative lymphangitis, a disease of identical etiology in horses has passed without record.

Ulcerative lymphangitis in horses was observed by Weber (6) in 1877, as probably also by Goux (7) as early as 1842 in Paris. In England the disease was attributed to the importation of Canadian stock and is supposed to have entered Europe from Great Britain. Dieckerhoff and Grawitz (8) were the first to recognize in "English pox" a specific microbial infection for which they proposed the name, "contagious acne of the horse."

In 1891, Preisz and Guinard (9) isolated from pseudo-

tuberculosis in sheep organisms differing from those described in similar lesions of other animals by a number of writers, particularly Eberth (10), Chantemesse (11), Nocard (12), Charrin and Roger (13), and others. It is the merit of Preisz (14) to have elucidated clearly the etiology of certain varying types of pseudo-tuberculosis among domestic animals and to have shown the dissimilarity of the bacillus which now bears his name. The question of pseudo-tuberculosis of various animals has been recently reviewed by Poppe (15) who gives a fairly complete bibliography.

In 1893 Nocard (16) recovered a Gram positive bacillus from the vaginal sheaths of cavies showing orchitis after injection of pus from sixteen horses suspected of farcy but giving a negative mallein test. Again (17) in 1896 pus from horses suffering from a disease simulating glanders produced orchitis in guinea pigs but the horses failed in seventeen instances out of nineteen to react to the mallein test. The excellent plates published showing the morphological and cultural characteristics of the causative organism clearly demonstrate its distinctiveness from *B. mallei*. The organism was believed to be identical with that already recovered by Preisz from pseudo-tuberculosis of sheep.

For fuller accounts the reader may be referred to the reviews of Nocard and Leclainche (18), and Hutyrá and Marek (19).

CLINICAL OBSERVATIONS.

Dr. Keane noted that "chest abscesses," as they are known locally, "usually started underneath or in the skin of the pectoral region. However, at times other parts of the body were affected, especially along the abdomen. The lesions started in the form of small circumscribed indurations which affected the skin and the tissues underlying. The infection, as a rule, was of chronic type and the lesions ultimately developed into abscesses, some of which were enormous in size." In our experience the abscess forms at a depth of 5 to 8 cm. under the skin and tends to gravitate. If unopened many days are required for natural drainage to the surface to become established, while the abscess

may attain in the meantime a diameter of 10 to 25 cm. The contained pus is odorless, thick, creamy, and often caseous.

The abscess heals readily by ordinary open wound treatment once drainage is established. In our series drainage was secured by deep incision at the lower limit of the abscess and some of the pus was drawn aseptically into a sterile syringe. The syringe was then capped, packed and sent to the laboratory in Berkeley. The cavity of the drained abscess was filled with oakum or gauze soaked in a mixture of Liquid Petrox (National Formulary, 3d. Ed. 1906, p. 120), containing 5 per cent. iodine and cleansed daily with an aqueous solution of coal tar disinfectant. The packing was removed after three to six days and healing usually followed very promptly. If the abscess had begun to ulcerate when first observed, sponging with the same material usually led to a cure within a few days or at most a few weeks. Neither of us has observed a second attack in a fully recovered horse.

On the other hand, if metastasis develops as in Case XIV, cure may be more difficult. This is the only case we have known to terminate seriously and since, unfortunately, cultures were not made at autopsy, it cannot be certainly ascribed to unmixed infection by *B. Preisz-Nocard*.

The following cases were studied: Case I.—A horse, aged 15 years or more, having worked in the foothills all summer was found September 2, 1913, suffering from an abscess of the pre-scapular gland. Incision through 5 cm. of overlying intact tissues released a quantity of caseous pus which yielded a pure culture of *B. Preisz-Nocard*. Packing and drainage was followed by relief in a few days and the wound was practically healed September 13th.

Case II.—A filly, 4 years old, at range or working in the foothills throughout the summer was found August 20, 1913, by the owner with a swelling on its chest. September 2d a pre-scapular abscess was opened by incision 2-3 cm. deep, followed by the usual packing and drainage. A pure culture of *B. Preisz-Nocard* was secured. It was necessary on September 8th to treat a secondary abscess in the same manner after which a quick recovery followed.

Case III.—A colt, aged $1\frac{1}{2}$ years, appeared September 11, 1913, with a prescapular abscess after having remained in a paddock in San Mateo all summer. Immediate incision 5 cm. deep followed by the usual packing and drainage gave relief as shown by reinspection September 13th, and September 15th a good recovery was evident. *B. Preisz-Nocard* was the only organism demonstrated.

Case IV.—An adult horse having worked in the foothills all summer was treated September 11, 1913, by antiseptic swabbing and daily thereafter for some days for an ulcer of the precrural region 2.5 cm. deep and 7.5 cm. diameter. When next seen, October 3, 1913, the animal had recovered. *B. Preisz-Nocard* was present in pure culture.

Case V.—An "old" mare, working in Redwood City all summer developed a very large hot, feverish pectoral swelling over an abscess which was drained October 29, 1913, by incision 6 to 8 cm. deep, this being followed by rapid recovery. *B. Preisz-Nocard* was present in a pure state.

Case VI.—A mare, 5 years old, was treated October 29, 1913, for a shallow pectoral ulcer by antiseptic swabbing. Cultures were uncontaminated and contained only *B. Preisz-Nocard*. This case was not heard from again.

Case VII.—A calf aged 5 months developed a cold subcutaneous abscess over the parotid gland which was opened November 3, 1913. A pure culture of *B. Preisz-Nocard* developed from the pus.

Case VIII.—A colt, 3 years old, having been at range all summer and fall in the foothills, was found suffering December 16, 1913, from a pectoral abscess, which was opened, packed and drained as usual. *B. Preisz-Nocard* was present in pure culture.

From this time on during the season no further abscesses were encountered, although a close watchout was kept. We had not yet identified the diphtheroid bacillus which we had found, but at a suggestion from Dr. K. F. Meyer, University of California, we undertook a study of the *B. Preisz-Nocard* as it occurs in sheep with the result that we obtained in pure culture from the

first abscesses secured from four aged ewes at the abattoir organisms identical with the diphtheroid bacilli isolated from the above horses. These constitute our Cases IX to XII, inclusively, and were secured June 4th, 10th and 11th, respectively.

Case XIII.—A horse, 15 years old, kept in a corral in a valley of the foothills was treated by incision and drainage of a pectoral abscess September 1, 1914, and again the day following for a secondary abscess. *B. Preisz-Nocard* was cultivated in pure culture. Reinspection September 17th indicated satisfactory recovery.

Case XIV.—A mare, aged about 15 years, used as a polo pony, having been kept in a marshy pasture near San Francisco Bay, was found September 14, 1914, with a prescapular swelling, which was opened, packed and drained in the usual manner. Cultures from the bloody pus secured were barren, however, possibly because of exposure to the blood in transit. The animal, kept now in the stable, appeared when inspected September 30th to be recovering nicely though very lame. Hot fomentations and lotions were prescribed but the lameness continued, being particularly noticeable from October 5th to 12th. October 19th acute stomatitis, accompanied by sloughing of large patches of mucous membrane from the mouth, became evident. October 27th a large subscapular abscess was opened and drained. The pus gave a pure culture of *B. Preisz-Nocard*, this being the first bacteriological proof of the nature of infection in this mare. Meantime, upon the presumption of a mixed pyogenic infection, three doses of stock vaccine containing respectively 1,000, 6,000 and 14,000 million mixed staphylococci and streptococci were administered subcutaneously. Viewing the bacteriological result it is not surprising that no appreciable reaction followed. Although the wound appeared promising November 7th, a large number of small multiple abscesses developed around it from November 10th to 16th, of which the more prominent were opened daily as they appeared. November 16th cultures were secured but these were impure, *B. Preisz-Nocard* being present but in mixed culture with staphylococci and streptococci.

November 18th, 1,000 million and November 21st, 2,000 million killed *B. Preisz-Nocard* were injected, of which the latter dose produced a marked local reaction lasting until November 27th. By November 30th, however, the leg was much better, with the swelling practically gone though a temperature of about 102° C. still persisted. For constipation a laxative pill was given which was effective though the temperature remained high, registering 104° C. and 103.5° C. on December 2d and 3d, respectively. December 11th, the temperature having fallen to 99.8° F., a further dose of 1,000 million killed bacilli was injected, followed a week later by 2,000 million. Within 2 days following the last a sharp local reaction* occurred with a slight rise of temperature to 101° C. and varying from that to a maximum of 103.5° C. December 25th.

Now began a period of anorexia associated with fluctuation of temperature and frequent outbreaks of pustules and abscesses in the lymphatics of the foreleg. The abscesses were opened as soon as located, probably 75 to 100 in all from the point of the elbow to below the fetlock, besides smaller confluent ones which broke spontaneously. During this period which occupied practically all of December, *B. Preisz-Nocard* was again secured uncontaminated in culture. During the last week the leg became very painful and a generalized infection was evidenced by high temperature, rectal relaxation and dyspnoea on December 29th and 30th and collapse December 31st. Death was then hastened by administration of chloroform.

Post-mortem examination showed the leg oedematous with many pyogenic foci especially along the lymphatics. The subscapular and mesenteric lymphatic nodes were enlarged and inflamed, with petechiae upon the intestines and many signs of generalized chronic infection.

Case XV.—A horse, 3 to 4 years old, kept in a valley near a marsh presented, October 28, 1914, a very large subscapular ab-

* The reactions aroused by this vaccine in comparatively small doses are significant in view of an experiment we made with a normal horse to prove the harmlessness of the vaccine, in which first a dose of 100,000 million followed in four days by 300,000 million produced no fever and an induration not larger than 12 cm. diameter and 3 cm. deep.



FIGURE I.—Case XIV—Nov. 10th, 1914, showing the location of the primary abscess and more prominently a principal secondary lesion, poorly healed, surrounded by several multiple abscesses.



FIGURE II.—Case XIV about Dec. 20th, 1914, showing the progress of the healing of the primary abscess and the formation of multiple abscesses and subcutaneous foci.

cess at the elbow, from which *B. Preisz-Nocard* was recovered in a pure state. The usual incision, packing and drainage led to an uneventful recovery.

Case XVI.—A horse, 6 years old, kept in a corral near the foothills was noted by its owner, November 5, 1914, with a pectoral swelling. Incision 5 to 6 cm. deep made November 19th yielded pus containing only *B. Preisz-Nocard*, as shown by culture. Drainage resulted in prompt uneventful recovery.

SEASONAL INCIDENCE.

From our experience of the years 1913-'14 and of one of us (C. W. F.) during twelve years previously, we believe that these abscesses occur principally, if not entirely, during the fall months. We have as yet no conclusive explanation for this fact though Gray (20) speaking of ulcerative lymphangitis attributes it to infection through cracked heels and other skin lesions.

In California the disease is most common just preceding the rainy season and appear to diminish with the coming of wet weather, so that before the apex of the average seasonal precipitation curve is reached during the months of January to March opportunity for field observations ceases. The fact that the abscesses are confined to the few months following the California dry season favors Gray's idea of hoof infection. It is well known among horsemen here that hoof lesions are frequent during July and August, so that this theory has much in its favor though as yet no absolute proof can be adduced in favor of any given method of infection.

One of us (C. W. F.) has repeatedly shaven the skin over developing abscesses with a view to finding the portal of entry, but no evidence of this being cutaneous abrasion could be ascertained. We suggest that infection possibly occurs also by buccal or intestinal abrasion through eating rough foods during the dry season, a view which finds support in the recorded environment of our cases previous to observation as well as in the experimental infection of a colt and a lamb by feeding,

recently reported by Boquet (21), and in the culture by Carré (22), of this organism from horses dead of colic. Klimenko (23) has emphasized the rôle played by injury to the intestinal mucosa in predisposing to the passage of bacteria through its wall.

SPECIES INCIDENCE AND GEOGRAPHICAL DISTRIBUTION.

Dr. Keane has noted that in his experience animals other than equine have not been observed to suffer from the disease.

All but one of our cases encountered afield were among horses, the exception being that of a calf (Case VII), but other instances of clinically similar infections in calves have been previously noted by one of us (C. W. F.).

Natural infection causing broncho-pneumonia in cattle according to Kitt (24) as well as a farcy-like disease mentioned by Lienaux (25) have been ascribed by these writers to the bacillus of Preisz-Nocard.

The extensive geographical distribution of infections due to the bacillus of Preisz-Nocard has been best demonstrated in sheep. Following the original discovery of the organism in pseudo-tuberculosis of sheep in France by Preisz and Guinard (9) in 1891, and its further observation there by Guinard and Morey (26), Turski (27) found the disease in Prussia, Sivori (28) recorded it in Buenos-Ayres, Cherry and Bull (29) in Australia, Norgaard and Mohler (5) in the United States and Gilruth (30) in New Zealand.

Seres and Guillaume (31) have also observed in hogs of Bordeaux, lesions due to this organism analogous to those of caseous lymphadenitis in sheep. We have found no opportunity to corroborate the occurrence of caseous lymphadenitis in swine.

Carré and Bigoteau (32) have noted a severe throat infection in man, a point to us of much interest viewing the possibility of contagion from eating insufficiently cooked infected mutton or pork overlooked during inspection.

We believe our observations to be the first recording infections by the bacillus of Preisz-Nocard in horses in the United States.

AGE AND SEX INCIDENCE.

Among our horses the ages ranged from 1½ years to over 15 years; the calf was five months old, and the sheep which provided cultures were old ewes. Among horses no apparent predilection has been found at any age, but Gilruth (29) thought old broken-mouthed sheep most susceptible, while Carré and Bigoteau (31) found in their extensive study that umbilical abscesses in young lambs were responsible for many deaths. These observations and our experience convince us that the age and sex of animals have little relation to the occurrence of the disease. Norgaard and Mohler (5) have noted that when older sheep of a flock were discovered infected that search for lesions in the younger members usually showed them to be also afflicted.

LABORATORY WORK.

Our bacteriological studies, which will appear in detail elsewhere, have convinced us of the identity of the causative organisms we have isolated from the above mentioned lesions with the bacillus of Preisz-Nocard, as it is described from ulcerative lymphangitis of the French and German writers and as it occurs in caseous lymphadenitis of sheep in the United States. In each of our cases, except the later stages of Case XIV, we recovered pure primary cultures of this bacillus. Aside from the bacteriological identification of the micro-organism it may be of interest to note that we have produced orchitis in guinea pigs by intraperitoneal injection of small quantities of cultures with considerable regularity. We have also confirmed the production of a soluble though weak toxin whose action upon guinea pigs, as already noted by European observers, is remarkably like that of diphtheria toxin. Large doses of bacilli washed in salt solution while capable of producing orchitis in cavies appear incapable of causing the toxic and acutely fatal symptoms which are obtained by the injection of whole cultures. Such orchitic guinea pigs apparently recover after a long chronic course of scrotal ulceration, but may subsequently die suddenly with internal lesions, particularly of the spleen and lymph nodes. We desire

to emphasize at this time the necessity of bacteriological examination of the pus produced in orchitis of guinea pigs injected with pus from abscesses in horses and particularly the unreliability of experimental orchitis in male guinea pigs as a sure diagnostic test for glanders.

SUMMARY.

We have observed during the fall months only in eleven horses and one calf, a peculiar abscess formation simulating in at least one case the ulcerative lymphangitis of European writers. These abscesses are usually, though not invariably, located in the prepectoral region and their depth in the tissues supports the idea of a true lymphatic infection; if unopened, however, they ultimately transform into ulcers. Ulcerative lymphangitis is well known abroad, but till now has remained unrecognized in the United States. The disease we have found usually yields to simple surgical treatment, but we have observed one refractory case.

Pure cultures of the specific cause were recovered from each of these cases and their identity was proven with similar organisms recovered by us from sheep afflicted with caseous lymphadenitis, *i. e.*, the bacillus of Preisz-Nocard.

In certain cases the infections we have studied bear some clinical resemblance to farcy, epizootic lymphangitis, and sporotrichosis, but may be readily differentiated from these by bacteriological analysis. Further, orchitis in male guinea pigs resulting from the inoculation of pus containing either *B. mallei* or *B. Preisz-Nocard* needs offer no confusion in diagnosis if the pus is studied microscopically and culturally.

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PRACTICAL HORSE POINTERS FROM THE SASKATCHEWAN DEPARTMENT OF AGRICULTURE—(*Farmer's Advocate and Home Journal*, Winnipeg).

Never water immediately after feeding grain; this washes the grain through the stomach in an undigested state and is apt to cause colic.

Two things a horse will do—fight flies if necessary, and eat green feed if he gets the chance. Don't punish him. You can't stop him. You would do the same if you were a horse.

Always groom horses well at night; an hour is little enough to spend on a four-horse team. Horses groomed thoroughly at night will only need a brisk brush over in the morning, and they will rest better.

Don't use the curry comb on a horse's shoulders. Many a sore has been started by the curry comb, and nobody knew what caused it. Should it be actually necessary to use the comb to remove dirt, do so very carefully.

Always hitch the tugs last and unhitch them first. Do not let the horses have control of a wagon or machine until you first get control of them. It is the sign of a safe driver to have the lines all in readiness and in easy reach before hooking any of the tugs.

When you let your horses rest on a hot day always have heads toward the wind. The other way the perspiration spoils the air that passes along the body to the end of the nose, and it does not refresh the horse a bit. Stand close in front and try it yourself a while.

(Concluded on page 48.)

HOG CHOLERA.*

BY EDW. A. CAHILL, V.M.D., BOSTON, MASS.

I am glad of an opportunity to address this association on the subject which has been assigned me. Twice before I have been honored by a similar invitation from your Secretary, but both meetings were postponed, as you know, because of the seriousness of the foot and mouth disease situation.

In considering the subject of hog cholera I am sure that every person present will realize that the subject is such a broad one that books of several hundred pages have been written upon the disease and its control. Therefore it is reasonable to suppose that in the short space of time allotted to me it is impossible to do more than touch upon a few of the more important considerations of the work, omitting many which may be equally important. Consequently I would ask those of you who are familiar with the disease and its control to be lenient in your criticism of my paper. So much has been written and said upon this disease that I feel it will be more advantageous for me to omit the time-worn discussion of the history, cause, symptoms, etc., and to confine myself a little more closely to some of the more practical aspects of the work, which would be more apt to appeal to you as owners and breeders. Considering the control of the disease from the standpoint of the State and a frank confession of the State's need of your co-operation, will probably reap more benefit to you and us than a detailed description of the symptoms and a scientific discussion of the causes of the disease.

We are very frequently asked why the State of Massachusetts prevents the farmer from immunizing his own swine and also as to why if the serum treatment for hog cholera is so successful the disease is on the increase, and I will attempt to answer these two questions for you.

* Read before the annual meeting of the Massachusetts Swine Breeders' Association, at Boston, followed by a demonstration of the Simultaneous Treatment, assisted by Dr. Frank Sturges.

It is known that taking the country as a whole the losses from hog cholera approximate \$60,000,000 a year for the last ten years, and according to a conservative estimate that the losses this year will reach more than \$70,000,000. This is in spite of the serum treatment rather than because of it. If you read the reports and opinions of the live stock officials, and breeders in the different states, you will find many who are enthusiastic in their support of the serum treatment, and you will find many who condemn its use. In some parts of the country the treatment is being hailed as a blessing to the breeder, while in other sections it is considered a curse. Magazines and periodicals are heavily laden with discussions pro and con as to the value of the serum treatment. Under these conditions it is no wonder that the average man, who is busy with his own affairs, and who does not know the inside facts, is bewildered by this mass of conflicting evidence. However, a careful study of the entire situation very readily proves that both factors are right in their contention, but that their conclusions differ because of their method. It shows most conclusively that the states which consider the entire problem a curse and where the serum treatment is not working successfully, are the ones which lack a proper law or regulation for the control of this disease and the administration of the serum treatment. On the other hand, it is very evident that in states where a strong law or regulation is in force that the results are most satisfactory and the treatment in great demand.

In one of the states where the treatment is in bad repute, it has recently come to light that the authorities in charge have issued 9,000 permits for the administration of the simultaneous treatment to almost any person who desired a permit, whether he realized the importance of the treatment or not. The result is that in that state alone the losses this year will be at least \$1,000,000 more than any previous year. Another Western state which has an Agricultural College gives a permit to any person who goes through a course of 60 hours' training. The holder of such a permit is allowed to use serum and virus anywhere within the state. Recently I visited a herd in that par-

ticular state which is considered one of the best in the country. This herd is composed entirely of registered Duroc Jerseys. Two hundred and ninety-eight head of young animals which were to be in a sale that had been extensively advertised throughout the country were immunized by a man holding such a permit. Six days after treatment they commenced to die, and the final result was that 27 animals were left while all the rest died. Another state announces very proudly that they issue permits for the administration of the simultaneous treatment only after a satisfactory recommendation has been given the applicant from his banker or some reliable citizen. In many other states where the treatment is not controlled exclusively by the state, damage to an extent which can not be calculated has been done by unscrupulous persons holding permits who buy cheap serum which generally lacks potency and after scratching the label from the bottle charge the owner of the swine the price of the best serum on the market. This kind of commercialism has probably done as much damage as any one thing. I could continue indefinitely giving you illustrations of this kind in states where the law in this respect is not sufficient. These few, however, will serve to illustrate my point as to why the treatment is considered a curse in these states. It could not be otherwise, and conditions can not improve until they get better regulations.

A similar condition existed in Massachusetts previous to last November. Any person who desired to do so was allowed to procure serum or virus wherever he saw fit, knowing absolutely nothing of the potency of such serum or the virulency of such virus, and administer it in any way he saw fit to his or any other person's swine. The operator might be skilled in the administration of the treatment, or he might be entirely ignorant as to the proper administration. A few instances of this may bring the matter more clearly before your mind.

Case 1: Mr. H. desired to have approximately 600 hogs treated. They were all given the simultaneous treatment. No temperatures were taken as, of course, they should always be. The animals were infected as temperatures would have shown,

and should have received single treatment. Practically all of the animals developed severe cases of cholera. Result, 60 per cent. died, at which time the state stepped in and saved the remainder by giving more serum.

Case 2: Mr. D. treated his own swine. Many animals were treated which were under twelve weeks of age. The result was that the owner who supposed that he had given a permanent immunity to his animals, all of which were valuable, had given only a temporary immunity, and at maturity lost several valuable animals.

Case 3: Dr. D. purchased a large amount of serum and virus. He had no occasion to use this for several months. Serum, as you know, will keep for a long time if kept at the proper temperature. Virus, however, is not safe to use after 20 days from the date it is drawn. After 7 months this man used the virus, which was of no more value than water, on a large herd, and the owner supposed that he had a permanent immunity when in reality he had received only an immunity which would last a very short time and would then leave his animals as susceptible to cholera as before receiving the treatment.

In addition to the cases given above, it was the common rule throughout the State for a large percentage of abscesses and cases of blood poison to follow the administration of serum. We have records of herds, treated by private individuals, where as high as 70 per cent. of the animals treated developed abscesses or blood poison. Our figures show that in 1912 there were 98,836 head of swine in this State; in 1914 the number had decreased to 59,221. This is a visible decrease of 39,615 animals. An investigation of this condition showed that some of it was due to a shortage of garbage, but the greater part of it was due to the ravages of hog cholera.

I am sure that every person among you, who is open to conviction, will agree with me that this condition of affairs could not continue very long without ruining the swine industry of our State, even though we are not considered a hog raising state. Consequently our Order No. 12 was promulgated by the Depart-

ment of Animal Industry and approved by the Governor and Council. This Order, as many of you know, prohibits the shipment, sale or manufacture, of serum or virus within the State by any person or firm except by permit. It also prohibits any person from using serum or virus unless he has been granted a written permit by the Commissioner of Animal Industry. We have been told by men who do not understand the conditions that this Order is unfair and works a hardship on the farmer because he could not immunize his own animals. -Instead of working such I hardship, I am fully convinced that it is the greatest protection that could possibly be afforded the live stock industry of this State, that it is working a great benefit and should have the support of your organization. To compensate what hardship the Order may work on the individual, let me tell you what the State is doing since this Order has gone into effect.

It is a proven fact, as I have already pointed out, that the simultaneous treatment when properly administered is associated with but very little danger, but when improperly used will spread cholera more surely and more quickly than any other means, and is positively a menace. This being the fact, the Commissioner of Animal Industry has not issued permits to any person in the State for the administration of serum or virus except to the agents of the Department who are specially trained in the subject of hog cholera. These men make a specialty of this work, and are in possession of the total results of the experimental and practical work which is being done by our Department as well as that carried on in other sections of the country. They are responsible to, and paid by the State. Each agent throughout the State who may vaccinate, administers the treatment in exactly the same manner as one in another part of the State. Is it not reasonable to suppose that such men having at their command the experience and results of several thousand inoculations, made by this Department, are in a better position to administer this treatment under strict State supervision than is the average man who has probably never vaccinated before, or at best, only a comparatively few animals, and is not responsible to any person.

We try to have a sufficient number of men equipped for this work to be able to answer all requests for immunization within a reasonable time or to have a man at a farm which is reported to have hog cholera as soon thereafter as possible. Added to the above is the fact that there is not as much cost to the farmer when the State immunizes his herd as were he to immunize it himself. He is charged only for the serum and virus which is used at exactly what it costs. The State pays all of its agents' traveling expenses, antiseptics used, equipment, etc. Any person who has ever seen our State agents immunize animals against hog cholera or treating animals already sick can very readily realize that the average man could not afford to carry the equipment himself, even if he were able to do the work; and that if it were done by his private veterinarian it would necessitate a good-sized fee in addition to the serum and virus used.

I have already pointed out to you the fact that previous to the time that this Order was passed any serum and virus could be used and much was used which was below standard. We have several excellent examples of the use of impotent serum, and virus which was not virulent, in this State under those conditions, with most disastrous results. In December, 1914, we received a large shipment of serum from a most reliable firm which later proved to be impotent, and because it would not protect the animals upon which it was used, caused a large number of deaths in every herd where it was used. In July of 1914 we received a shipment of virus which was used upon a large herd for simultaneous treatment. Cholera apparently stopped completely after the treatment, although it was a badly infected herd, having been so for years. About 10 weeks later cholera again broke out in the animals which had received the simultaneous treatment, and which should have been permanently immune. Investigation proved that the virus was not virulent when used, and consequently the animals received only a temporary immunity from the serum which was administered. I mention these two instances to show you that even when purchasing serum and virus from the so-called best houses, one is liable occasionally to receive

virus or serum which is not up to the standard and which consequently will do immeasurable damage. The ordinary farmer has no way of determining whether or not serum is potent or virus virulent, and he must trust implicitly in the producer. This is another excellent reason why Order No. 12 was so badly needed. The Department now tests all of the serum and virus that is used in the State. Consequently the owner is certain that the serum used is potent and that the virus is virulent, and this is one of the greatest assets which you could have. The two most important conclusions arrived at to date in hog cholera control is that hog cholera positively can be controlled by the simultaneous treatment, but that the serum must be potent and the virus virulent; and that both must be properly administered. These two conditions are guaranteed by the method now followed by the State, but without such a regulation as Order No. 12 this would be impossible; and again I repeat that it is only in the States which have some similar law to ours where the disease is being held in check and the treatment is considered a benefit.

To date the results which have been derived from our work are not surpassed by any other State, but we realize our limitations. The demand for our work is taxing our capacity, and we need particularly at this time the co-operation of such men as belong to this association. It is foolishness for any person to become so enthusiastic regarding the serum treatment as to believe that all one needs to do to control cholera is to inject serum into animals. To get the best results, as most of you know, we must either immunize to prevent the disease, or if the disease is already present in a herd, to give the treatment as early as possible. The sooner we treat swine after they become infected the larger the percentage saved. Remember, too, that we will not vaccinate unless conditions are good. Animals must be in dry, clean quarters and positively must have nothing to eat the days they are vaccinated. They must be kept clean and dry for at least four days following vaccination, and must not have more than half rations during that time. Best results can only be derived by meeting these requirements. Disinfection is one of the most

important problems of the whole control scheme. The State is not in a position financially to carry out the proper disinfection of all infected premises, but if the owners were to co-operate to this extent it would help materially in controlling the disease. So, too, if you men would help us regulate the traffic in infected animals which have not been vaccinated, you would be doing a noble work. There are, no doubt, many places in the State where the owner realizes that his animals are infected with hog cholera, but who unhesitatingly will sell such animals from his herd to some unsuspecting buyer who in turn infects his entire herd. There are members of your organization who have been victims of such methods and so infected their herds. This is usually due to a financial consideration, but the day is not far distant when it will be practically impossible for a man to sell swine to other stock men unless they are immunized. We are not going to demand it, but it will be demanded by the purchaser, who is very rapidly reaching the stage where he realizes that his only safety lies in this method and that the cheapest insurance which he can have is to have immune swine.

To those of you who have not yet decided to immunize let me urge you to be careful of the animals which you purchase, one or two new animals may mean the entire loss of your herd. I would urge you to visit other piggeries as little as possible and to entirely discontinue the practice of going to your neighbor's piggery when he has sick swine. One of the greatest precautions that you could take would be to have a pan of a strong antiseptic solution at the door of your piggery and compel every person to dip his shoes before entering your piggery and again on leaving. If every person was to do this many outbreaks of cholera would be prevented.

In closing I would ask you, collectively and individually, to give us your assistance against the worst animal plague in this country. We need your help and you need ours. This is not our fight as much as it is yours, and we feel that we should be able to turn to this organization as the one in the State which is most concerned in this work. Our records and work are open to your inspection and our advice and service yours for the asking.

NEW VETERINARY PRACTICE LAWS FOR OHIO.*

F. A. LAMBERT, D.V.M., SECRETARY, OHIO STATE VETERINARY MEDICAL ASSOCIATION, COLUMBUS, OHIO.

Ohio has had a Veterinary Practice Act since the spring of 1894. There are those present who were instrumental in securing the passage of this original law at a time when the speaker was in the third grade of public school. For a number of years the profession has realized that this original law, which has been but slightly altered in all these years, was inadequate in its provisions and too vague in its specifications to keep pace with the rapid and progressive development of veterinary medicine. Too much credit, however, can not be given to those who pioneered our legislative career in 1894 and secured a veterinary practice act before any other profession in Ohio had a similar law.

For a number of years the profession in Ohio discussed the matter of attempting the passage of a new law. These discussions resulted in nothing tangible. It has been the speaker's observation that circumstances really forced the profession into this last legislative effort, which we feel has resulted in a 90 per cent. victory.

Our veterinary practice law has always been "hitched" to the Agricultural Act. In 1913, when the Cox regime with its policy of centralization abolished the old agricultural board and created the commission, some of the best features of our original law were lost because of the fact that the profession had no "watch dog" on the ground. Since the agricultural situation was quite an issue in the last gubernatorial campaign, we had sufficient warning that our law would again be "juggled" for better or for worse, depending entirely upon our efforts.

Ohio's new veterinary practice act was incorporated in the so-called "Agricultural Ripper" bill (amended S. B. No. 250), passed by both houses of the legislature and signed by the Gov-

* Read before the joint meeting of the Northwestern Ohio and Michigan State Veterinary Medical Associations, at Toledo, Ohio, July, 1915.

ernor Thursday, April 15, 1915, effective in ninety days thereafter.

The law provided that the Board of Agriculture (ten members, non-partisan), shall appoint three veterinarians, graduates of reputable but different schools, who shall constitute a state board of veterinary examiners. Their terms are for two, four, and six years, and one shall be appointed biennially thereafter for a term of six years. Since its creation in 1913 the Agricultural Commission has temporarily appointed three veterinarians to examine applicants and report the result of same, after which the board was dismissed and the certificates issued and signed by the Commission. So the first point sought and won was to have a permanent State Board of Veterinary Examiners to control veterinary examinations and certificates, and sign the latter.

The State Veterinarian shall be ex-officio the Secretary of the new Board, and shall keep an accurate record of all business, examinations and certificates. It shall also be his duty to report each violation of the laws relating to veterinary practice to the prosecuting attorney of the violator's county and to assist in securing indictments and convictions. That is to say, that the State of Ohio and not an individual shall take the initiative in prosecuting violators of the veterinary practice laws.

A certificate to practice in Ohio can be obtained only by successfully passing an examination. Such examinations are to be given in Columbus in April and July of each year. The law specifies that the examination shall include the following subjects: Veterinary anatomy, physiology, general pathology, veterinary pathology, materia medica, veterinary therapeutics, medicine, surgery, obstetrics, control of contagious diseases, meat and milk hygiene, sanitation and veterinary jurisprudence. An average grade of at least 70 per cent., with no grade below 50 per cent. in any one subject, shall be required for passage. The old law stated no minimum in any one subject.

An applicant for examination shall be a *graduate* of a veterinary college *recognized* by the State Board of Veterinary Examiners before taking the examination. No longer need graduate

veterinarians sit alongside of the emperic, the village blacksmith, and the race horse "swipe" in an Ohio examination. Nor does the Ohio Board need to take an accredited list of veterinary colleges from any outside source. The Board will have the power to investigate and recognize schools. One of the more distasteful clauses of the new law reads: "Any person who within six months after this act becomes effective, submits satisfactory evidence to the State Board of Veterinary Examiners that he was engaged in the practice of veterinary medicine and surgery in this state prior to May 21, 1894, and who pays a fee of \$2.50 to said Board, shall be entitled to practice veterinary medicine and surgery in this state, and shall receive a certificate from the said Board signed by the members thereof, etc." The same paragraph also states that "no person shall, after six months following the date on which this act becomes effective, practice veterinary medicine and surgery in this state without first having obtained from the State Board of Veterinary Examiners a certificate entitling him to engage in such practice." That is to say, gentlemen, that no prosecution of illegal practitioners can take place before January 15, 1916.

Many veterinarians have made the comment that the new law stated no penalty for violation, etc., I would therefore call your attention to the statute, Section 13382, General Code of Ohio, which reads: "Whoever engages in the practice of veterinary medicine or surgery in violation of any provision of law, shall be fined not less than ten dollars nor more than twenty-five dollars, and for each subsequent offense shall be fined not less than fifty dollars nor more than one hundred dollars or imprisoned in jail not more than sixty days or both. This section shall not prohibit veterinary advice or service in cases of emergency, if rendered by a person not entitled to practice, or apply to animal castration and dehorning of cattle."

The fee for taking the examination shall be five dollars, with no part refunded in the event the applicant fails, as has been done in the past.

The veterinarian who successfully passes an examination shall

receive a certificate from the State Board of Veterinary Examiners signed by them. This certificate may be revoked by the same Board for: (1) Failure to report to the State Veterinarian dangerously contagious and infectious diseases as prescribed by the Board of Agriculture. (1) For dishonesty in applying the tuberculin test in cattle. (3) Gross malpractice or violation of criminal laws. Ohio laws have in the past contained no revocation clause for veterinary certificates.

The last paragraph defines what shall constitute the practice of veterinary medicine, surgery and dentistry. The new material in this paragraph reads: "A person shall be regarded as practicing veterinary medicine, veterinary surgery or veterinary dentistry within the meaning of this act who uses the words or letter 'Dr.,' 'Doctor,' 'Professor,' 'D. V. M.,' 'M. D. V.,' 'D. V. S.,' 'V. S.,' or any other title in connection with his name which in any way represent him as engaged in the practice of veterinary medicine, veterinary surgery or veterinary dentistry in any of its branches, etc." So the time is close at hand when one need no longer wonder, when he sees John Smith, V. S., on a shingle, whether John is a licensed practitioner.

The new law is not in all respects as satisfactory as it might be, nor is it all that the profession in Ohio desired and sought. But when we realize that of all professions we have been the most inactive legislatively, we cannot help but feel encouraged at the very favorable result of our first well organized effort in this direction. This most recent legislative experience has served to open our eyes to many things which will be of value in the future. Most important of these, perhaps, is that we have been made to realize that the profession is now appreciated and highly regarded even in the General Assembly.

A clause stating what preliminary education an applicant must have had before entering a veterinary college was defeated on the floor of the House by an amendment by Representative Bruck of Cincinnati. This provision was not to become effective until 1918, and was very liberal in its demands. It is the source of much regret to the speaker that this clause was not passed. Had

it been more uniformly supported by the profession in this state, it could easily have become a part of the new law. Time does not permit a free discussion of this matter of entrance requirements; it is a broad enough theme in itself.

I should like to say a word or two about the value and necessity of organization. In Ohio we have a number of good Veterinary Medical Associations, all of whose constitutions state that the objects are for the material advancement of the profession. I do not know that Ohio is second to any state in the Union in the matter of veterinary organizations. It is a question in the speaker's mind, however, whether we, in Ohio, are concentrating enough on the really important issues facing the profession to-day.

The new law is the direct result of a quickly but well organized and concentrated effort on the part of the Ohio State Veterinary Medical Association, backed by the strong Ohio Public Health Federation, of which it is a member. Many veterinarians in the state who are not members of the association were drafted for this conflict, and in most cases rendered valuable and efficient service.

VETERINARIAN HUNTER, SURVIVOR OF *IBERIAN*, ARRIVES IN BOSTON.—We read in the *Globe*, of Boston, Mass., of August 23, of the arrival there of Dr. J. S. Hunter, a Canadian passenger on the *Iberian*, when it was sunk by a submarine.

SIX COUNTIES ARE PLACED IN QUARANTINE.—Six counties in Illinois were placed in close quarantine Wednesday by the Federal and State governments following new outbreaks of foot and mouth disease. The quarantined areas include Cook, Bureau, Ford, Henry, McDonough and Warren counties. The Union stock yards in Chicago are again placed in restricted area.

Dr. Orrin Dyson, State Veterinarian, declared to-day that new outbreaks had been traced positively to infected anti-hog cholera serum.—Sevanna, Ill., *Journal*, August 18, 1915.

COUNTER IRRITANTS OR BLISTERS.

BY G. H. CONN, D.V.M., PRAIRIE DEPOT, OHIO.

Of all the methods employed by the laity in the home treatment of the diseases and injuries of the domestic animals, the time-honored blister or counter-irritant is the one usually applied, and in my experience it is contra-indicated many times more than it is indicated in the conditions in which it is applied by the average layman. In the first place most people think that because a blister relieved some other condition in some animal that they might have seen the treatment applied to, that it is the proper treatment for their animal, never taking into consideration the pathology of the particular condition. The laity are not the only people who make such a constant use of counter-irritants, but there are numerous veterinarians who seem to have a blister for every condition that affects the members of the domestic animals. I know of a veterinarian not many miles from me who has used so many blisters that he is known to the people over this part of the country by the name of "Blister Bill."

There are several things to be taken into consideration when using these agents; the part to which it is to be applied, its mode of action, its length of action, the strength of the agent and also the mode of application. The action of blisters may be summed up as follows: First, we have a redness of the skin and an increased blood supply to the part and some burning and pain. If the irritation is continued or a stronger agent is applied, we have an aggravation of this condition with an exudation of serum; if a still stronger agent is used or the first is continued sufficiently long, we have pustules formed at the root of the hair follicles, and the hair drops out and a thick heavy scab is formed. As a rule the hair returns in a short time, as the hair follicles are usually uninjured; the application of grease favors the early return of the hair. If the counter-irritant is applied for some time or applied with violent friction, or is covered with a bandage or is applied

over an acutely inflamed area, we have an escharotic or caustic effect and the hair follicles are destroyed and do not return.

We usually apply counter-irritants for their local effects on the skin or the tissues immediately beneath it; many times we use them for their effect upon some remote part of the body, usually being some remote organ. All of the actions of counter-irritants used in this way cannot be explained nor can satisfactory theories be advanced for them. It is without a doubt due to reflex action and also to the stimulation of some nerve which has a branch in common, which supplies some of the internal organs. We apply counter-irritants to the chest in congestion of the lungs, in pneumonia, pleurisy, etc., as we commonly say to draw the blood to the surface; but they do more than that, they drive the blood from these distant parts. We have learned from our study of physiology that the nerves carry impulses from the periphery to the brain, hence we can understand how that by stimulation of the skin we can bring about a change of some of the bodily functions. The skin is an organ of respiration, secretion, special sense, an organ of protection and a regulator of temperature.

Extensive counter-irritation causes the respiration to become slower and deeper by reflexly stimulating the respiratory center, and also from the pain produced when breathing if the counter-irritation be applied over the region of the chest. The heart is stimulated and blood pressure is raised from stimulation of the vagus nerve and the vaso-motor centers. If, however, the irritation is very widespread and severe, the reverse is true. This explains why heat with mustard or turpentine is valuable in shock, coma and depression. Counter-irritation in chronic conditions starts a tissue change, dilates the vessels, renews the circulation, and in this way chronic inflammatory exudates are absorbed.

Counter-irritation should never be applied to an acutely inflamed area, and the greatest of care should be exercised when applied where the skin is thin or over an articulation. The nature of the animal, the condition affecting it, and the strength and manner of applying it should be taken into consideration when using such agents.

Without a doubt the rubefacients or that class of counter-irritants which only produce a redness and swelling with a dilation of the blood vessels and which bring an increased blood supply to the part are the most valuable of these agents and the most largely used. They are comprised of volatile oils, alcohol, iodine, mustard and several others. Most of these agents are used and known as stimulating liniments when combined with suitable agents. These are particularly valuable for the resolution of those swellings that are usually the result of acute conditions affecting the limbs, udder and throat and also for strains and bruises.

The most common agents used for blistering are croton oil, cantharides and red iodide of mercury; used on exostoses and breakdowns and also to secure rest for some particular part. Largely used in curb, spavin and ringbone, their results are brought about by the production of an acute inflammation, together with tissue changes and vascularity and fatty degeneration. The hair should be clipped over the area to be blistered and the site washed with soap and water and the animal should not be allowed to bite the parts. By sponging the parts around the blistered area with soap and water, they can be protected from the discharges; grease or vaseline may be employed.

Caustics or escharotics are agents which destroy tissue, and for that reason are not used as largely as the others. They are used for the removal of exuberant granulations, tumorous growths, sloughing and necrosis; they are mineral acids, silver nitrate, sulphates of copper, iron and zinc and several others; the actual cautery comes under these agents. These agents are really destructive agents instead of constructive agents, and for that reason do not find as large a field of usefulness as the others. Silver nitrate, however, sometimes favors resolution in slow-healing granulating wounds and is often used for this action.

Suppurants are not much used at this age, but may be employed by the laity and some empirics. Any of the more active counter-irritants may become suppurants if properly applied. The seton and rowel were the two most common methods of

bringing about this condition, but they were both dirty and barbarous, and they are fast becoming obsolete.

A great amount of damage is often done when such agents are applied carelessly or where they are contra-indicated. The utmost care should be observed and the best of judgment should be displayed by the use of this much-used class of agents or bad results, and ones that will reflect to the discredit of the user, will be sure to result. I saw a horse about one year ago that was blistered over the left knee and allowed to work every day, with the consequent opening of the joint and rendering useless of the animal. I heard of another mare that had a blister applied to a sweeney which was so caustic that it sloughed away the muscular tissue and started a necrosis of the bone which became so extensive that it was necessary to destroy the animal.

My advice to the laity is this: Consult a qualified veterinarian about the conditions for which you usually apply a blister and have him prescribe the one which is indicated. It requires just as great a knowledge to prescribe counter-irritants intelligently and for their best uses as it does for many of the other remedies.

I doubt if there are many of us but what become careless and empirical in our treatment of many common conditions and also in the use of certain classes of treatments. We cannot be too careful in our diagnosis, and especially our prognosis, and above all, our treatment. If we make an effort to have a thorough understanding of the results we expect and also of the pathology of some of the more common conditions, and also thorough knowledge of some of the more common methods of treatment, we can then make the people see that we are fitted to do their work, and then we will have solved the problem of the quack. It is the small things that most times make a success or failure. Many are able to do big things and many times extraordinary things, but when it comes to common everyday conditions that they meet with they do not give them the attention that they should, and this is the time that many of the laity lose confidence in the veterinarian's ability, and it is then hard for the veteri-

narian to regain this confidence. I have found that it takes practical knowledge, theory, good judgment and an abundance of tact and a pleasing and winning personality to be a success among some classes of people, and there is some of this class in every community. So it behooves us to use as much care, judgment and as successful treatment in the common conditions as it does some of the more dangerous acute conditions.

(Continued from page 30.)

If a horse is very warm, let him drink about five swallows, then hold his head up for about half a minute to let his stomach cool slowly. After that let him drink a reasonable quantity. Do the same yourself in hot weather, and cold water will not hurt you if you drink a gallon.

Don't get into the habit of yelling at your horses. They will soon learn not to pay any attention unless you do yell. They can learn to obey a spoken word better than a yell, as it does not irritate them. It is the mark of a good hired man not to be heard a few rods away.

A horse works with his shoulders. Keep them well. Look at them three times a day. Keep them perfectly clean. Keep the collars clean. Fit the collar snug against the neck. If a shoulder gets sore it is the driver's fault. Some men always make sore shoulders, some never do. One man is worth several times as much as the other.

In working colts remember that they are like children, have to be shown over and over again. They should not be expected to learn their business the first year, and always get over a tongue right or wait for their turn to be unhitched, or stand perfectly still in the field and not turn around to see what you are doing. You must exercise patience and good judgment, and not spoil them.

A horse cannot work in ill-fitting harness. Try it yourself. Especially must his collar be continually watched. Don't let a horse work an hour in a collar that is too tight or too loose. His neck will change as he loses or gains flesh, and the collar and harness cannot be fastened the same each day. This is especially true in the spring when work first starts. A good man is often seen in front of his horses looking after the collars and hames the first part of the season.

HEMORRHAGIC SEPTICAEMIA.*

BY A. T. KINSLEY, KANSAS CITY, MO.

Hemorrhagic septicaemia is a specific disease of cattle and related animals and is caused by the *B. bovis* septicus.

This disease has been identified in various sections of the United States and many foreign countries. It was recognized in Tenn., in 1898, in Minn., in 1901, and more recently it has been observed in Mo., Kans., Nebr., Iowa and other states. Many veterinarians have reported a type of infectious pneumonia, especially in young cattle that had passed through public stock yards, and on investigating many of these outbreaks it has been found to be the pulmonary form of hemorrhagic septicaemia.

Young cattle are more susceptible to the disease than older cattle. The condition of the animal does not appear to be a factor in susceptibility as those in good flesh are as frequently affected as those that are thin and emaciated.

Changeable weather predisposes to the disease or at least more cases are observed in the fall and spring season.

The specific cause of the disease is the *B. bovis* septicus an organism belonging to the *pasteurella* group. This microbial agent is universally distributed and therefore it is not uncommon to observe sporadic cases of the disease. It is probable that the *B. bovis* septicus rarely produces disease, except in those cases in which the resistance of the infected animal has been diminished, in other words, it is probable that animals must be especially predisposed before they will contract the disease. The shipping of cattle during inclement weather causes them to become chilled and their lungs are especially affected by the inhalation of cold air and they are thus predisposed to pneumonia, and the omnipresence of the *B. bovis* septicus almost insures infection and the possible production of the pectoral form of hemorrhagic septicaemia.

* Read before the Missouri State Veterinary Medical Association, at St. Louis, July, 1915.

The *B. bovis* may gain entrance to the animal body through the various mucous membranes, but especially the respiratory and digestive mucosa, and it may also be introduced through the skin.

Three different forms of this disease have been described, viz., pectoral, abdominal and exanthematous. The primary lesions of the pectoral form occurs in the thoracic viscera, those of the abdominal form in the abdominal viscera and those of the exanthematous form in the subcutaneous tissue.

Hemorrhagic septicaemia is characterized primarily by hemorrhages which occur in the subserosa, submucosa and subcutis. In addition to the hemorrhagic lesions the pectoral form is evidenced by the accumulation of serous fluid in the plural cavity and by pneumonia, in which there is a marked interstitial exudation that gives the lung a marbled aspect. Areas of hepatization occurs in one or both lungs, these portions being red, brown or grey in color and of a friable consistency, other portions of the lung will appear hyperaemic and hemorrhagic. The visceral pleura may be covered with fibrinous exudate. Subpleural hemorrhages are very common. The mediastinum may contain a gelatinous exudate.

The abdominal form is characterized by a hemorrhagic enteritis and peritonitis in which there is usually a quantity of serous or sero-hemorrhagic exudate in the peritoneal cavity. In some cases the spleen may be enlarged.

The subcutaneous form is evidenced by a marked accumulation of serous exudate in the subcutum, particularly of the inferior cervical region.

Reynolds and Munn have reported some cases in which there was a marked hemorrhagic meningitis. It is rather common to find two or more of the foregoing types of lesions occurring simultaneously.

The symptoms of this disease depend upon the type of lesions. The early stages of the disease are usually evidenced by depression, dullness and inappetence. There is suppression of milk. The affected animals are usually stiff and have little tendency to

move. There is usually a rise in temperature of from 2 to 4 degrees F. The pulse rate is increased and the character changed. In the pectoral form, respiration is increased and the breathing is especially difficult. The affected animal has a dry, painful cough and there is a frothy serous or sero-sanguineous nasal discharge. Pleuritic friction sounds and solidity of lung areas may be determined by a physical examination. Those cases in which there is involvement of the abdominal viscera, show digestive disturbance, as colic and diarrhea, the fecal-discharges being frequently streaked with blood. The exanthematous form of the disease is characterized by subcutaneous inflammatory oedema, especially of the inferior cervical region, although it may occur elsewhere. This tumefaction may interfere with circulation, deglutition and respiration, as well as with locomotion.

The meningeal type is manifested by disturbances of the brain functions. Animals so affected are usually nervous, excitable and sometimes vicious. In the subacute or chronic form of the disease the affected animals show marked emaciation.

Symptoms indicating the presence of a single type of this disease may be observed, but it is not rare for the disease to affect the thoracic viscera in the beginning and later the digestive viscera becomes involved. Such cases show a combination of symptoms.

Hemorrhagic septicaemia may be acute or chronic. The very acute form of the exanthematous type usually terminates fatally and in from 6 to 36 hours. The pectoral form rarely terminates fatally in less than three days' time. The prognosis is unfavorable. In those animals which recover from the pulmonary form, a chronic lung affection usually persists.

Medical treatment of this disease is of little value. Various drugs have been used in the different types of the disease, but the fatality still persists at about 90 per cent. Since the B. A. I. advocated the control of this disease in the buffalo of Yellow Stone National Park, by the use of bacterins, the author has recommended it in the control of hemorrhagic septicaemia of cattle, and those that have adopted this preventive treatment,

speaking of its efficiency as follows: Dr. Stanley Smith of Columbia, Mo., "one lot of 56 cattle, in which eleven had died and practically all remaining animals (45 head) were affected at time of use of the bacterin, two only were lost after injection of bacterin, and they were down at time of treatment and we did not expect to save them. I think bacterin a good preventive and have advised several cattle men to have their cattle immunized before shipping."

Dr. A. J. Munn, Fayette, Mo., says, "I have treated one herd of 40 head of cattle affected with hemorrhagic septicaemia, in which 3 animals were affected at the time of administration of bacterin. Two of the three affected animals recovered and none of the remaining 37 contracted the disease.

Dr. Horace Bradley of Windsor, Mo., sent in the following report of his investigation of eight herds:

Herds No.	Head of Cattle.	
1	105	In these three herds the affected animals were treated with stimulants.
2	53	
3	40	
4	48	100% loss of sick animals.
		20% loss of entire herds.
4	48	4 dead, 1 sick treated with bacterin, no further loss.
5	28	2 dead, 1 sick treated with bacterin, no further loss.
6	54	2 dead, 52 sick treated with bacterin, no further loss.
7	82	2 dead, 62 sick treated with bacterin, no further loss.
8	3	1 dead, none sick, no treatment, all died.

Dr. F. C. Reid, of Lamonte, Mo., reported as follows on one herd: This herd was comprised of 121 three-year-old steers, of which 7 died before treatment, 11 others were sick when bacterin was injected, and there was no further loss.

This brief paper with appended reports has been prepared with the intention of stimulating a full discussion upon this topic.

RURAL PROGRESS.

RECENT RURAL ECONOMIC MOVEMENT.

BY L. M. STECKEL, D.V.M., NEW YORK, N. Y.

Even before the cry of the high cost of living became universal, thoughtful and far-sighted persons recognized the need of a better farm development both from an economic and social standpoint. The social welfare of the farmer is as important as the economic, since better living conditions and social intercommunication lead towards contentment, and a contented farmer can work his farm to better advantage.

During the Rooseveltian administration the country life movement was given a strong impetus. In 1908 President Roosevelt appointed a commission to make an extensive study of country life in America. This commission found that agriculture is not commercially as profitable as it ought to be to repay the farmer for the labor and energy that he expends and the risks that he assumes, and also that social conditions in the open country fall far short of their possibilities. The three fundamental recommendations of the commission were; first: to make a survey of all conditions that surround the business of farming and the people who live in the country; second: the organization of nationalized extension work; third: the inauguration of a general campaign of rural progress.

Since then a new awakening has taken place. The wheels of rural progress have turned for the betterment of farming conditions and a great deal of work has been and is being accomplished. As might be expected, the national department of agriculture has inaugurated new lines to help the farmer in all phases of his work. It established an office of markets to investigate the conditions which tend to cause the farmer to receive less than fifty per cent. of the prices paid by the consumer for farm products; also to determine ways and means for improving this condition as well as to study new methods of marketing whereby the producer and consumer can be brought closer together. In

co-operation with this office the Post Office Department has established various parcel post routes to facilitate the farmer to ship his products direct to the consumer. The government also established a Rural Organization Service to study ways and means to help the farmers get together and to devise methods to improve the condition of the farmers from a social standpoint.

The Department of Agriculture is also co-operating with various state agricultural colleges, experiment stations, county committees and boards of trade in establishing farm bureaus for the dissemination of scientific knowledge and methods of working the farm and disposing of farm products. The United States Congress passed the Smith Lever Act, appropriating a sum of money, which in ten years is to reach \$4,580,000, to be used in agricultural extension teaching. This money will be distributed among the different agricultural colleges to be used only for field demonstration work. One of the most important accomplishments in this line was carried out by the American Agricultural commission which went to Europe in the summer of 1913 to study rural credit, co-operation, production and marketing as carried on by the farmers in the various European countries. As a result of the commission's report, various bills have been presented to Congress for the establishment of national land banks. It is anticipated that before very long a law for the creation of such banks will be enacted. The work of the commission has also awakened the entire country to the importance of agricultural co-operation in the field of production, marketing and credit. The New York state legislature passed a law authorizing the establishment of a land bank and made additional appropriation to the Agricultural Department for the furtherance of its work in agricultural organization and co-operation.

New York state and many other states have now County Farm Bureaus with one or more progressive farm agents in a county as leaders of this work. Their duties are to help the farmers in the county in all phases of agriculture, such as co-operation, demonstration work on the farms, co-operative purchasing of supplies, marketing of products, as well as the dis-

semination of scientific knowledge in modern agricultural methods. *Perhaps the greatest result of all this agitation was the formation in the public mind a different feeling towards the tiller of the soil.* The farmer is no longer looked upon as inferior to the city man. The urban population is now more readily mingling with the rural folks. Quite a number of people in other professions and businesses are now taking up farming as a future vocation. Many young men and women who formerly ran away from the farm to take up law, medicine or business in the city are now following studies in agriculture and willing to remain on the farm to help along in this universal rural progress. We find as well many young men and women in the cities anxious to take up farming for their life work.

Many improvements have been made for lightening the work for the farmer's wife. The farmer can attach a belt from his gasoline engine and run the washing machine. He can fasten the belt to the churn and make butter. The same belt can also pump water into the kitchen. Farm sanitation, too, has received considerable attention. The farmer no longer needs to bewail the fact that his home is not as sanitary as that of the city man. He can have his hot and cold water, bath and sanitary plumbing installed at a reasonable outlay.

Good roads, not only for automobilists, but to the farm homes, are a great aid to the agricultural population, both from the economic standpoint—the farmer can easily carry his products to the market—and from a social standpoint, the farmer can reach his neighbor for business or friendly calls. The Rural Free Delivery, which is now universal, and the extension of the telephone have had a great deal to do in making the farmer more contented in his otherwise lonely life. Another factor which has brought about better conditions in the farming community is the extension of the trolley service. Thus there is virtually no market not open to the farmer. By this means, likewise, he can very readily communicate with the outside world.

Much as has been done to make farming more profitable, the farmer and his family more contented, we look forward with yet

greater hopes for a still broader agriculture when the farmer will take his full share in the evolution and progress of our civilization.

With this march of progress, the veterinarian should aim to keep pace. Not only must he be a man of broad training in veterinary science, sanitation and the general field of animal economy, but he should also familiarize himself with the vital questions affecting the people. Together with the minister, physician, teacher and county agent, he should work for the improvement of the community and exert his influence towards broadening the life of the agricultural population. In proportion to the betterment of the welfare of the people, his own standing becomes of importance.

SMITH-LEVER ACT.

Passed Congress February 7th, 1914.

Signed by the President May 8th, 1914.

In effect July 1st, 1914.

It provides the giving of instruction and practical demonstration in agriculture and home economics to persons not attending or resident in agricultural colleges.

The appropriation is as follows:

\$480,000 per annum, or \$10,000 for each state which accepts the provision of the act. In addition to the above, there is further appropriated \$600,000 for the second fiscal year, and for each year thereafter for seven years \$500,000 additional until the 10th year a total of \$4,580,000 is reached, and this amount will continue annually thereafter. The \$480,000 is a permanent appropriation, while the additional appropriation is conditional upon each state contributing an equal amount, and the money also is to be distributed to each state in proportion to its rural population.

STORK BRINGS TWINS TO DR. CAHILL'S HOUSE.—Dr. and Mrs. E. A. Cahill, Boston, Mass., were blessed with twin boys, weighing 4½ and 6½ pounds, on September 20. We congratulate the fortunate parents.

REPORTS OF CASES.

RABIES?

By V. SCHAEFER, Tekamah, Neb.

I am not reporting this case because I can give any light on it, but because I thought I might bring out a little discussion that would throw some light on "mad itch." I call it that because I haven't any other name for it. May 10, I was called to see a mule about nine or ten miles out that was biting himself on the side. The mule didn't seem to be bad other ways, but they had him tied. He had been biting himself and had torn off hide and hair. I had seen cattle in this condition a number of years before, but never had seen any horses or mules before, so I didn't know what to do. I gave him a dose of arecoline and eserine and it seemed to stop the itching for that evening. It was a while before sundown, and the animal seemed to be better, so I left him. The next day it was reported to me that he was worse again. I went to see him again. He was in a bad condition, biting right and left, and I believe it bit a man's limb nearly off. That mule died. A few days afterward I was called to the same place, and there was another one acting the same way, but it died just before I got there, so I didn't see the animal. About the 10th of June I was called to see an animal affected in the same way. It was biting itself, and everything in sight. A fellow would hold out a board, and the animal would snap it. The animal died while we were there. It showed the first symptoms in the morning. Seemed to be off a little bit, but didn't seem to be very bad, but the animal wasn't right. Kept on getting worse until about dark. That evening the animal died. I have seen a good many cattle affected in a manner similar to this. I held a post mortem on two of them and could not find anything. Afterwards I saw some spayed heifers that would bite their hind legs until they tore the hide off, and finally died, and it was supposed by some of the farmers to be due to some poisonous weed.

I am giving my experience on these cases thinking probably somebody might know something about it. I have seen it in animals at different times and called it mad itch for want of a better name. In the cattle I held a good many post mortems and I

* Reprinted from the Proceedings of the Missouri Valley Veterinary Association, 1911.

could not see anything to show that there was anything wrong, but some animals lived about two days and some of them started in the morning and died at night. I have stated this case because I thought some one might give a little light on the subject.

DISCUSSION.

A Member—I would like to ask the gentlemen if he ever saw any horses die with rabies?

Dr. Schaefer—No, sir.

A Member—Then you can't tell the difference between this trouble and rabies?

Dr. Schaefer—No, I cannot.

Dr. Walrod—In regard to these cattle biting themselves and rubbing themselves: I found a good many cases like that in a man's yard, in the rear of a yard where they had millet hay, and he had lost several animals. I held post mortems, and in every case the third stomach was impacted. They were very wild and would tear the flesh off the hind legs and sometimes lick the hide off and I had them taken out of there and put in a field and given some oats and changed the diet altogether and there wasn't one died after I went down there. It was all a trouble with the third stomach was my experience.

Dr. Schaefer—I could not find that in some of these cases. I found something similar to that in the cases I spoke of in 1904, some animals that had some symptoms of corn stalk disease, but there was some millet there also. I found impaction of the third stomach. It seemed as if the cattle were crazy and they thought it was rabies but it was undoubtedly due to eating millet. After I saw the cattle I told him to quit feeding millet, but he kept on and finally I went up there and saw 14 or 15 head lying down, and I told him he had better keep them off the millet, but he didn't want to do it, because he didn't think that was the trouble. That man lost 14 or 15 calves—they were coming yearlings—before he finally agreed to let me change yards. That was the only thing I could recommend because I never found anything else that did any good. He changed yards and he lost 25 or 30 head. In those other cases I administered cathartics, some of them were not very far along, gave epsom salts, but got no results.

Dr. Thompson—We had the same thing this winter up where I am and we decided it was due to mold on alfalfa. We had had many cattle and steers that acted the same way about biting, and all of them died. We know it was not rabies—we have had no

rabies up there. We decided it was the food. We cut off the feed, and we didn't have any more trouble.

Dr. Schaefer—In the case of the mules, I attributed it to some poisonous plants in the pasture. The last mule was kept away from the others and had never been in the pasture where the first one was. The man had 200 mules in the different pastures; but that is the only thing I could attribute it to, was poisonous plants. The first one died at night—the mule that died when I was there. I wanted to post him but the next morning it rained and I could not do it.

President Stouder—Dr. Pammel, can you throw any light on this subject?

Dr. Pammel—I am a botanist—I would have to see the plant. If I had the plant here I would be glad to name it for him.

Dr. Vermillion—I have had all kinds of cases like that. In Indiana I had some cattle that had what they call the “mad itch.” They would go up to the side of a tree or to the barn and rub their eyes out, or run into a wire fence and tear off their flesh. They all died. Two or three years ago I saw two steers which acted that way, only they didn't bite themselves. They would have spells of excitement, would lay down, run their heads up against a wall, and rub all the skin off the side of their faces, and then they would appear to be all right for an hour or an hour and a half and two hours, and maybe again we would have to tie them up with rope. They would go up against something and rub the skin off their foreheads and the sides of their heads, and go on for a week that way. All of those cases recovered. I didn't do anything except to give oil. I believe that must have been due to weeds or something like that which was stopped up in the alimentary canal and caused irritation, and inflammation set up and would finally cause irritation of the skin. They didn't carry a temperature of over one or one and a half degrees at any time. However, I have seen something similar to that in cattle when they ran short of water. Around the tank in the pasture there was quite a lot of sand as well as water. The calves would go up there and sink in the sand where the water would seep out, and they had the same symptoms, and recovered. It wasn't so extensive as in the case of those cattle that had mad itch. They had these exciting symptoms, and we thought at that time that it was due to irritation caused by the sand. It probably was not, but they all recovered and none of them carried confirmed symptoms.

Dr. Griffith—Wouldn't it be possible that it was hemorrhagic septicemia? I have had some trouble similar to that.

NOTE.—The caption on this article is ours, the author not having given it any other than "Case Report," and our first impression on reading his description of the case was rabies. That, we believe, would be the impression of the average city practitioner; but it seems, from the discussion that followed, to have been the impression of only one of the members who discussed the subject. Realizing the many conditions met in the country—upon which practitioners base a diagnosis—that are not met with in the city, we have published the discussion that followed the presentation of the paper; from which it would seem that, in the opinions of those present, there are many things other than rabies that might account for the symptoms Dr. Schaefer described in the mules and cattle that he had observed. It would be interesting to know what the microscope would have revealed in a smear from the brain of one of those mules.—[EDITOR.]

SPINDLE CELLED SARCOMA IN ENGLISH BULL TERRIER.

By CRITTENDEN ROSS, D.V.M., New York, N. Y.

On or about June 28th, Doctor Ellis was called to see an English bull terrier, female, which he had had occasion to treat five years previously and at which time a portion of a rib was removed. This time there appeared at the same place of the previous injury a large growth with a fluctuating point, which was



lanced at the office the next day and a quantity of caseous material was removed, after which a tampon was placed in and the patient sent home. It was then given daily treatment for a few days and as the thick wall did not reduce and the growth appeared to be getting larger, it was operated upon; after which the outcome looked very hopeful for a few days, then the growth developed very rapidly again and was interfered with again by operative procedures. After a month of such efforts

the patient was considered hopeless, as the growth appeared more and more of a malignant nature. It might be added here that a specimen of this growth had been sent to Dr. Kaupp, but was not sufficient from which to make a positive diagnosis; therefore after the patient was destroyed another specimen was mailed, from which the doctor stated that the growth was a spindle celled sarcoma.

LACTATION IN A SEVEN-DAYS OLD CALF.

By J. WILLIAM FINK, D.V.S., Newburgh, N. Y.

Sending you herewith photograph of grade Holstein calf born July 4th, 1915, having a fully developed mammary gland secreting milk. Photograph shows the udder which is about



Independence Girl, born July 4, 1915. Commenced giving milk when seven days old.

the size of two large fists with well developed teats about one inch long and milking from all four quarters, the milk is of good quality; the quantity about a pint up to the third week has now increased until it gives a quart night and morning.

The calf is from a grade Holstein mother and a pure bred bull. Has been kept by itself since it was born (and not with

other calves), except when it was nursing. It began giving milk when it was seven days old. The owner noticed the udder enlarging the first week and tried one of the teats and found to his surprise it contained milk, and has milked it steadily night and morning ever since, until it has increased in quantity to about a quart night and morning.

There is nothing unusual about the size of the calf; being an ordinary sized month-old calf. I have searched all records, inquired of a number of dairymen and breeders and have been unable to find a parallel to this phenomenal calf. Have had several veterinarians and expert herdsman examine the udder and milk to verify the truth and condition, and had them milk the calf and examined the mouth.

At present the calf is being exhibited at the neighboring county fairs and pronounced by everyone who sees it as a remarkable freak of nature, and unheard of before. It surely speaks well for the Holstein breed of cattle as milk producers at an early age.

A HINNY MULE AND HER TWIN COLTS.

By Dr. L. A. RAY, Quincy, Indiana.

I am sending you a half-tone and history of the hinny and her twins. One is now dead.



The only Hinny Mule and her twin colts known to exist. Bred and owned by J. M. Bryant, Quincy, Ind.

History.

Dam of hinny, a black Spanish jennet; sire of hinny, a grade Percheron horse, chestnut sorrel in color. The hinny is 8 years old, 14½ hands high, 900 pounds weight. Black with white points, good and typy in all points, works in the team, good worker and plenty of ambition. She was bred July 7, 1914. Foaled July 11, 1915. She was bred to a mammoth jack, gray in color. Twins both females, one living now, other lived but 7 days. One 25 inches high at birth, other 30 inches high.

FOLLICULAR MANGE.

By H. S. EAKINS, D.V.S., Professor of Histology and Materia Medica,
Division of Veterinary Medicine, Colorado Agricultural College.

Various authorities state that treatment of follicular mange in dogs is most unsatisfactory. As I noticed another item in this connection in the August number of the Review, I thought the veterinary profession would be interested in the following case reports:

White English terrier entered clinic March 16, 1915. Squamous type of follicular mange very extensive over head, including face and ears; extensive over neck and shoulder regions; scattered over back, legs and under surfaces of body. Parasite demonstrated. Hair was shaved from head, neck and shoulder regions where the lesions were numerous. Hand treatment with bristle brush, using *sapo mollis* and two per cent. aqueous solution of liquor cresolis compositus was a preliminary measure. After skin became dry, Iodine Petrogen, ten per cent., was thoroughly rubbed into the skin wherever lesions presented themselves. In order to prevent the spread of the condition to the few remaining healthy skin areas, there was applied to these areas Oleoresina Aspidii and Balsam of Peru in Linimentum Saponis Mollis. Daily treatment with the Iodine Petrogen resulted in a rapid recovery, and the condition did not spread, due no doubt to the daily treatment of the non-affected skin areas with the above outlined combination.

Imported Japanese spaniel entered clinic July 13, 1915. Squamous type of follicular mange very extensive over entire head, being worst around the eyes and on the ears; and extended to forelegs. Pruritus was intense and dog was in agony. The right cornea had been scratched, resulting in an opacity. The long hair was clipped and preliminary treatment as in first case

was given. The nails were clipped and infants' stockings were securely placed on feet, this in an effort to prevent scratching. To the lesions was applied daily equal parts of Oleoresina Aspidii and Iodine Petrogen, ten per cent., being rubbed in well. The dog became quiet. The worst lesions succumbed to the above treatment in about seven days. However, the mange had spread to the body, hind legs and tail; but was quickly brought under control with the Iodine Petrogen-Male Fern treatment. A thorough examination of the patient three weeks after entrance to the clinic did not reveal a single lesion of mange. During the course of treatment, nuclein (for human use) was given subcutaneously every two days. The opacity of the cornea was overcome through a one to two-thousand cyanide of mercury aqueous solution.

TUBERCULOSIS OF THE HEART.

By PAUL RUNGE, V.M.D., Newark, N. J.

Tuberculosis of the heart although reported at times, is no doubt very rarely found; so I thought it might be interesting to report a case I was fortunate enough to find.

This condition was found in a cow which on antemortem examination gave no suspicions of being affected with tuberculosis. It was killed together with nineteen others, for food purposes.

Post-mortem inspection revealed a very advanced case of generalized tuberculosis with the following organs and glands affected:

1. Submaxillary lymph glands. Well marked. 2. Lungs. Extensive. 3. Bronchial and Medrastinal Glands. Extensive. 4. Pleura. Well marked. 5. Heart. Extensive. 6. Aorta and Pulmonary arteries. Well marked. 7. Mesenteric Lymph Glands. Well marked. 8. Liver. Miliary. 9. Portal Glands. Well marked. 10. Spleen. Well marked. The heart weighed about twenty-five pounds and was more than three times its normal size. About three-fourths of the heart showed caseous tuberculosis and the left wall was about five inches thick.

DEATH FROM LIGHTNING STROKE IN A HORSE.

By S. S. WERTZ, M.D.C., Kenesaw, Neb.

Was called to see a horse that the owner informed me he thought had distemper and wanted me to come at once. The

night before we had had a severe electric storm and a heavy rain.

Arriving at the farm, was informed the horse was in the pasture and they were unable to move him. Went out to see him. Found a black gelding, smooth mouth. He refused to move; standing with legs braced to support his weight. Neck kinked, head hanging down and swelled, left eye sunken in, mouth open and tongue protruding out 3 inches. The horse being unable to draw it within his mouth. Pulse, 60; temperature, 102 degrees; respiration, 40; was discharging saliva from mouth. There were several scratches where he had been in the wire fence. The ground around horse showed where he had struggled around a good deal. On looking over the fence both ways from where the horse was standing, I found where the posts had been split and splintered up, showing that the fence had been struck by lightning. The inference was that the horse had been standing with head close to the wires when lightning struck the fence and knocked him down. Treatment being useless, horse was destroyed. It looked like a plain case of lightning stroke to me.

OBSTETRICAL CASE IN A COW.

BY THE SAME.

Was called to an obstetrical case in a cow. Arriving at the farm found a posterior presentation with the legs flexed. The calf was easily removed but was dead.

On examining the contents of the uterus encountered a hard substance which upon being removed proved to be a mummified fetus with the umbilical cord wound twice around one of the hind legs, which was the cause of the death of this fetus and caused it to mummify. Cow recovered without any more attention.

LAMINITIS AND LEUCOCYTIC EXTRACT.

By CYRIL GOLDING, D.V.S., Dinuba, California.

On April 24th, 1915, I was called to treat a grade Percheron mare, nine years old, suffering from typical symptoms of an acute attack of laminitis. History indicated that she had suffered two previous attacks and a very guarded prognosis was

given. The animal was in acute pain, temperature 104, pulse 65. Five doses of Leucocytic Extract (Archibald) of 6 c.c. each were administered once each twenty-four hours, intratracheally; no adjunctive treatment was given, resulting in a complete cure at the end of the fifth day of treatment.

Results obtained from the use of Leucocytic Extract in the treatment of several consecutive cases of laminitis have by far exceeded all expectations. Am reporting above case on account of the fact that this mare has suffered from two previous attacks, although of much less severity than present one. On previous occasions the usual routine, or symptomatic therapeutics were applied including phlebotomy, soak-tubs, injections of adrenaline chlor, into plantars, also the alum treatment, but in spite of same it has been compulsory to allow at least four weeks to elapse before she had sufficiently recovered to be able to resume her duties.

Providing such a word is permissible Leucocytic Extract is a "Specific" for laminitis.

HOG CHOLERA: Beginning on page 31 of this issue of the REVIEW, is an article on hog cholera by Dr. Edw. A. Cahill, Director of the Hog Cholera Division of the Massachusetts Department of Animal Industry, which treats of the practical side of the question, and appeals to the swine breeders of the State for their co-operation. Dr. Cahill's arguments are forceful and impressive, and we are convinced were fully appreciated by the members of the Massachusetts Swine Breeders' Association, to whom he presented his paper.

EXAMINE HORSES FOR DOURINE.—Sixteen hundred examinations been made by special veterinarians, who, with the State Veterinarian of Nebraska, have been looking after the horses quarantined in the counties of Cherry, Blaine, Grant, Thomas and Hooker. Dourine, the disease which has caused the quarantine, has shown itself in twenty-eight cases where there is no question as to appearance, while three more cases examined are suspicious. There are yet about 400 more horses to be examined. A question which involves the damages will be due the owner of the horses which will be killed is whether the money will go to the owner of the horse or the holder of the mortgage on the horse.—Pawnee, Neb., *Chief*.

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

STRONGYLUS ARMATUS IN THE TESTICLE OF A CRYPTORCHID [*Prof. Fred Hobday, F.R.C.V.S., F.R.S.E.*].—The author has already published several similar cases and adds this one to the list.

Nice black riding horse 7 years old was very troublesome, useless and unreliable on account of his rig propensities.

Under chloroform he was operated. The right testicle had been removed and a cicatrix on the left side of the scrotum showed that a previous attempt to remove the left testicle had been made. At the operation this was found in the abdominal cavity, under the loins and being three times the normal size. The spermatic cord was very oedematous and as thick as three fingers. The organ was removed with the ecraseur. There was no spermatozoa but a perfect mature specimen of *S. armatus* was discovered. The exterior of the organ gave no indication of abnormal condition in the interior. Perfect recovery followed.—(*Vet. Journal.*)

ADRENALINE IN HŒMOPTYSIS [*L. C. Maguire, M.R.C.V.S.*].—Five-year-old mare has had a cough for some time. Taken out for a drive it was noticed that after a few hundred yards blood was coming from her mouth and she had then a violent fit of coughing. At each cough a large mouthful of clotted blood was ejected. She was sent home and when the author visited her an hour after he found the ground where the mare was standing covered with blood. The mare was in a hopeless condition. Two drachms of adrenaline chloride were given hypodermically. Before the injection the fits of coughing occurred about every half minute, but after they did not return for five minutes, with then only a small amount of blood ejected. Within twenty minutes the bleeding and the cough had ceased and did not return. The mare must have lost at least a gallon of blood.—(*Vet. Record.*)

PERFORATION OF THE AORTA BY SPIROPTERA SANGUINOLENTA IN A HOUND [*T. S. Tirumurti, M.B. and C.M.*].—Record of the post mortem of a slut that died suddenly. Noth-

ing abnormal in the abdomen except viscera very pale. Thorax and pleural cavities filled with large amount of darkened blood. Mediastinum distended with infiltrated blood. A firm nodule noticed at the lower end of the oesophagus. This nodule was about the size of a walnut and was of fibrous nature. Small cavities existed in the meshes of its structure containing numerous reddish worms. The mucous of the oesophagus was perforated in one point and a worm was observed passing through. On opening the thoracic aorta, perforations were also detected with clots round them and reddish worms were found passing through them. The fibrous vermiform nodule of the oesophagus was directly opposite the aortic perforations. All the other organs were found healthy. The worms collected for further examination were found reddish in color, from 3 to 5 c.m. long and according to their anatomical details recognized as *spiroptera sanguinolenta* (red) by Neumann.—(*Vet. Journal.*)

PRIMARY MALIGNANT DISEASE OF THE LIVER IN A HOUND WITH SECONDARY DEPOSITS [*By the same.*].—Slut was off her food. Liver and spleen were enlarged. Blood examination negative. Animal is suspected of piroplamosis. She dies after eleven days from the injection of neo-salvarsan she had received.

Postmortem showed muscles very pale. Peritoneal cavity contained clear blood-stained fluid. Liver enlarged with numerous raised growths. Pleural cavities and pericardium contained clear serous fluid. Heart pale but normal in size. Lungs pale. Spleen enlarged, soft and flabby with raised whitish deposits of various sizes. The liver had on its surface and in its substance growths of various sizes also. Kidneys normal. Lymphatic glands of the abdomen enlarged. The primary malignant disease of the liver was the cause of death.—(*Ibid.*)

FRACTURE OF THE ATLAS IN A TOY POM [*Guy Sutton, F.R.C.V.S.*].—Seized by the back of the neck, by a bull terrier, this toy pom was left with complete paralysis. After forty-eight hours he regained consciousness and tried to raise his head. He failed and only succeeded in moving his lower jaw. Attempts to raise the head gave rise to convulsions and unconsciousness. Fracture of the atlas is made out by radiograph. Absolute quietness and rest are the only possible indications.

The dog is fed with liquids, bowels emptied every third day with enemas. Urine is discharged naturally.

At the end of three weeks, the animal was able to raise her

head and get up on her chest. The paralysis gradually subsided, and soon after there remained no mark of the event except pain when the muzzle of the dog is brought towards the chest.—(*Ibid.*)

ERYSIPELAS AFTER SPAYING [*J. N. Pringle, M.R.C.V.S., B.V.Sc.*].—Very interesting case recorded of a bitch properly spayed which forty-eight hours after developed an erysipelatous swelling of the face. It began at the right eye and gradually increased and spread. The eyeball was considerably projected out, the face had become so that it had lost all shape, both eyes being now involved and closed, the lips being also swollen, hard and painful. The pulse has risen to 120 per minute and the temperature $104^{\circ}2$ F. It was only towards the seventh day that the symptoms began to subside. The treatment of course was complicated. Hot fomentations as local applications and according to indications aconitis, veratrin, digitalin. Frictions of Ichthyol ointment were also resorted to and finally hypodermic injections of camphor, ether and oil. This last was followed by the first manifestations of improvement. During this complication the cicatrization on the seat of spaying had gone on comparatively well, with merely a little hernia of the omentum which demanded an interference of no serious nature.—(*Vet. News.*)

FRACTURES OF THE OS PEDIS [*Messrs. Eaglesham and McDonald*].—These gentlemen, at a meeting of the Central Veterinary Society presented specimens of fractures of the os pedis, which occurred in special conditions.

The first was obtained from an aged London vanner. The animal had been laid up for several months with meningitis, and one day as he was brought out into a paved yard he was seized with one of those brain attacks, had violent convulsions and threw himself down violently in the yard. On raising him, it was found that he was very lame on the off foreleg and scarcely able to mark the ground with the foot. A fracture was suspected and the horse destroyed. At the post mortem the pedal bone was found fractured through the centre.

The second was somewhat similar. The animal made a false step when working in the street and fell lame in a hind foot. There was pain in front of the frog, and in a day or two pus was formed. A ring bone formed. After treatment the animal was able to do slow work. Six months later he dropped dead in the street from ruptured heart. On post mortem the fracture was

found as having involved the articular surface, but there had been no displacement.—(*Vet. News.*)

RUPTURE OF THE STOMACH [*W. R. Davis, M.R.C.V.S.*].—A cart mare had a fistulous wound in the left abdominal wall, midway between the last rib and the stifle. It did not interfere with her work, but the treatment that was followed did not seem to arrest the flow of pus, and the mare was kept at work. After some time she had an attack of catarrhal fever and got over it. Then she was taken with two successive attacks of colics, from which she recovered. A third attack was more severe, although not very acute. The mare would lie sometimes on the side and again on her breast. She had flatus and eructations not infrequently. Her feces were soft. Enemas, ether, oil or peppermint and physic ball were prescribed. The next day she made attempts to vomit and died.

Post Mortem.—Large quantity of greenish fluid escaped from the abdomen, large rupture of the stomach, with parts of the contents in the abdomen. A piece of twisted wire, two inches long, was discovered in the tract of the fistula. It was evident that the wire had been swallowed and piercing the bowel had made its way into the abdominal wall and travelled in its thickness in a forward direction towards the rib.—(*Vet. Record.*)

FRENCH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

TWO CASES OF OBSTETRICS [*Mr. J. Raymond*].—These are two cases of cows affected with epizootic abortion, so called by Prof. Nocard in his description of the disease made in 1886, where the learned professor demonstrated that this disease is subject to a law, by which year by year the abortion takes place later and finally always disappeared after the second attack.

First case, a thirteen-year-old cow had aborted the year before of a seven months foetus and this time she was ahead by a number of days. The calf was in anterior presentation, with limbo-pubic position, the fore legs flexed could not be felt and were along the body, the hind up against the roof of the pelvis. After pushing back the foetus in the uterus, the little fellow was turned and brought in posterior presentation, lumbo sacral position and delivered. The cow has had two calves since, no abortion.

Second case. Eight-year cow has calved a week ago. She is doing well, but presents at the vulva a shrunk foetal membrane,

brownish and with a somewhat fetid odor. Exploration of the vagina reveals the presence of a mummified foetus. It is removed. The cow keeps on well. This cow, previous to the last normal delivery had had an abortion before, three months after being served. She was afterwards taken to the bull and as five months and ten days after she did not seem pregnant, she was served again with the result of the last normal accouchement, and having then the mummified foetus and its envelope in the vagina.—(*Presse Veterin.*)

PARAPLEGIA AND HOT AIR [*Dr. Douchet*].—When two years old, the slut which is the object of his report, had after an attack of distemper a complete posterior paralysis with fecal and urinary incontinency. She was treated for several weeks and recovered incompletely.

The present history is that after a long walk, the dog—now three and a half years old—was exposed to a cold shower and the next day she is paralyzed behind with relaxation of the vesical sphincter. For a whole week, she was submitted to the ordinary treatment but with very little if any benefit. It is then that the use of the hot air was thought of.

With an aerothermo (Rupalley) carrying a graded thermometer from 50 degrees to 225 degrees, twice a day, on the lumbar region, a stream of hot air, lasting twenty minutes, was applied. First the stream was at 115 degrees and gradually raised to 130 degrees. After the fifth sitting, the animal was able to stand on her hind quarters for a few minutes. The treatment was continued as far as the 9th day, when after 18 applications of the hot air, the recovery was complete.

Seven months later, after a severe washing, the dog was badly rubbed dry and took cold. The next day she shows paresia of the right hind leg and absolute inaction of the left. The dog can scarcely stand on her feet. Same treatment with hot air is immediately resorted to and after three sittings the right leg has returned to its normal function and after the tenth the left also. Once more recovery was complete.

Eighteen applications of hot air in the first attack brought recovery, and ten in the second were followed by a similar good result.—(*Bullet. Soc. Cent.*)

ON THE TREATMENT OF EPIZOOTIC LYMPHANGITIS [*Mr. Chatelain*].—From the conditions of the lymphatic lesions observed by the author, and in the presence of the failures of the many treatments recommended against the invasions of the cryptococcus, cause of the disease, Mr. Chatelain preconises the fol-

lowing as the one which is likely to procure the best results. This treatment requires three essential conditions—1. Evacuation of the pus by the free incision of the abscess and the sterilization of the cavity after its exit; 2. Sterilization of the entire invaded region, reaching to the internal face of the skin and made with an antiseptic, powerful but not toxic or caustic; 3. The introduction in the general circulation of any antiseptic of the blood preventing the spreading of the disease and the invasion of the healthy tissues.

The technic is simple, after disinfection of the parts, the abscess is opened with the bistoury or the actual cautery and in each purulent cavity is introduced a crystal of sulphate of copper, varying in size accordingly, generally as big as a pea. In the second step of the operation, the disinfection of the invaded region, the author recommends to divide the said region in spaces about the width of two hands and on their periphery to make a small incision through which, after laceration of the subcutaneous cellular tissue, an injection is made of 10 c.c. of a solution made of 80 parts of water, 20 of tincture of iodine, 2 of iodide of potassium and five of glycerine. In a third step an intramuscular injection is recommended in a muscular region surrounding with 10 c.c. of a solution of 1,000 grammes of water and 10 of Blue of Methyline.

The author concludes his article in saying that this treatment is radical and simple as it requires no other interference except the washing of the wounds with an antiseptic and possibly in some cases the renewal of the application of the crystals of sulphate of copper.—(*Rev. Gen. de M. Vet.*)

CARCINOMA AND CRYPTORCHIDY IN THE HORSE [*Mr. Bonnigal*].—Cryptorchid heavy draught horse, 12-year-old, is killed for butchery.

In opening the abdominal cavity, is found on the right side, hanging in the lumbar region, by a cord 6 or 7 centimeters thick and 30 in length, a testicle with about its typical shape but enormously hypertrophied. It measured 35 centimeters in length, had a diameter of 18 centimeters and its cord as well as the organ were covered with well-developed vinous network.

On section, it shows a white soft tumour, homogenous and run through by conjunctive bands. The pulpe is thick, easily crushed between the fingers and has all the characters of encephaloid cancer.

This horse during his life had never presented any genital excitement, and did his work regularly with other horses.—(*Presse Veterin.*)

CORRESPONDENCE.

"A VERY USEFUL PERSON."

WOODBURY, N. J., August 25, 1915.

Editors AMERICAN VETERINARY REVIEW, NEW YORK: The axe has fallen, our worst fears are realized, and we have been committed to that Gehenna where all our sins of omission and commission must be expiated.

An editorial in the *New York Medical Journal* for August 21, 1915, has given us our place when classified as "very useful persons," and there we must henceforth remain (duly ticketed with our natural order and habitat) until another equally high medical authority takes issue as to the exactness of the classification.

Consider this deeply, oh, my brother! "A surgeon who offered his services for work with the French army was asked whether he spoke the French language, and upon answering in the negative, was politely told that he could not be accepted, as he would be 'little better than a veterinarian.'"

"The expression does not reflect on the healer of animals, for the latter is a very useful person" (editor of the *New York Medical Journal*).

Our only hope is that the classification is erroneous, although the very high authority from which it emanates makes our chances slim, indeed. However, classifiers err, and no doubt the distinguished New York editor would object to Carlyle's classification of man—*i. e.*, "Man is an omnivorous biped that wears breeches." It might apply to some men, men of the lower types—"useful persons"—but we cannot imagine the sapience that dubbed the veterinarian a "very useful person," accepting Carlyle's biting dictum personally.

Unfortunately for our outraged feelings, a medical descent of several generations, and a lifelong, usually pleasant and instructive association with medical men, debars us from the lusty revenge of slinging a few bricks into the editorial glasshouse. We have our opinions, but we refrain. We were about to remark, still, realizing that silence is golden, also polite, also professional, we desist from our projected revenge. Our curiosity, however, prompts us to ask a question, we should like to know our autocrat's nationality.

In Europe we speak of a young person in service, a person who is a draper's assistant, etc., etc., thus drawing the distinction between a person and a personage. Is it possible our surmise that our critic is an imported personage is correct?

Anyhow we are distinctly given to understand that a gentleman who is privileged to place the letters M. D. after his name is a personage, while a V. M. D. is but a person, for this, much thanks; still while we regret that the veterinary profession is in such evil case, we shall in the words of a distinguished member of the medical profession—Professor Munyon—place one hand beneath our coat tails and passing the fingers of the other delicately through our ambrosial hair, remark: "There is hope."

THOS. B. ROGERS.

OBITUARY.

B. A. SUGDEN, D.V.S.

Dr. B. A. Sugden died at his home in Montreal, Canada, on July 30, 1915, in his 43d year, of heart failure. The doctor had been just twenty-five years in this country, was a graduate of McGill and a member of the A. V. M. A. Dr. Sugden was a very successful practitioner, and his sudden demise has caused a great loss to the community in which he lived and practiced.

He is survived by a widow, Mrs. Gladys B. Sugden.

THE FORMAL OPENING OF THE NEW YORK STATE VETERINARY COLLEGE AT NEW YORK UNIVERSITY took place on September 22, 1915, in conjunction with that of the medical college, at the medical college building. Dean Brown of the medical faculty made some announcements and a short address, and then introduced Chancellor Brown, who made a splendid address. The veterinary students, of which there were an encouraging number, were supported by the presence of Drs. Gill, Blair and Ellis of the veterinary faculty.

SOCIETY MEETINGS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

The fifty-second annual convention of the American Veterinary Medical Association was formally opened by President C. J. Marshall at Oakland, Cal., on August 30, 1915, at 10 a. m., who then introduced the first speaker as follows:

President Marshall: The gentleman who is on the program to deliver the address of welcome is sick, but we have a better man in his place. It gives me pleasure to introduce to you Mr. H. C. Capwell, of the Chamber of Commerce of Oakland, who will deliver the address of welcome. (Applause.)

Mr. Capwell: Mr. President, Ladies and Gentlemen—I am a ringer. Probably in your particular line of business you have had something to do with ringers, and know what I am talking about. The President told you the man who was to deliver the address is not here, but that you have a better man for the place. If I am a better man, I want to say, you came just in time, gentlemen, because Mr. Metcalf is sick. The Secretary of the Club, who would naturally take his place, is sick. The First Vice-President is sick; the Second Vice-President is sick; thank God, I am hearty and well, and I am here to address you. So, assuming I am the best man, you see you had a narrow escape.

I am surprised that so many of you have come across the continent to attend this meeting. In these days when the knicker of the horse is not heard in the land so much as the toot of the automobile, I am glad there is still much for you to do, and will be, because until Burbank has discovered a milk weed which will furnish the proper kind of milk with which to make a milk punch, we know you still have something to do, and you have the men to perform the task.

It is with great pleasure that I come here and look into the faces of you who feel, that notwithstanding the great competition of Ford and some others, that you have a mission to perform and are going to do it in the proper manner, and as evidence of the fact that you are capable of doing that, you have selected this as your meeting place. I always take pleasure in saying whenever I have occasion to say anything to people who have come to us from out of the State of California, that you are living up to the desire that I know is in the heart of all right-minded people. I

hold it is perfectly proper that people in this life should have two strong desires or hopes: One is that in their lifetime they shall come to California and have the pleasure and the joy of beholding the glorious sunshine of this state and the beautiful scenery of it; and the other is that when they shall be no more and they shall say goodbye to loving friends gathered around, if it just happens in that way, that after that they shall want to get to heaven. But there is this compensation, that if for any reason—say the overturning of an automobile or the kick of a mule comes between you and the other place—having seen California first, you are not going to miss very much (applause), especially when you have seen what we consider the best part of California. California, as a matter of fact, is the playground of the world. But, gentlemen, the part of California which you are now visiting is the merry-go-round of the world. Here is where you hear the tinkle of the music and see the bright colors. The merry-go-round is right here in this Bay region, and we feel we have just as much as you can find in the whole state of California within a radius of one hundred miles of San Francisco and Oakland, and we are mighty glad you have come here.

I am very sorry, indeed, that you will not have the privilege of listening to the splendid address I am satisfied the ex-Secretary of War, Mr. Metcalf, would have given you. Now in these days when we have Secretaries of War who know nothing about fighting, and Secretaries of the Navy who came from the farm, and all that sort of thing, I see no reason why you should not have a man, who is a merchant, to talk to you about the veterinary profession—a thing of which I know so little. The people who do the most talking on any subject usually are those who know the least about it, and I don't know but that that is an advantage, because it does not take them as long to do it, although they think it does. There is some advantage in that anyhow.

You are now in session, the President says, and I feel perfectly safe in stating the fact that if the Mayor were here and all the citizens of Oakland were here, that they would simply say in one voice that they are glad you are here; we want you to come back again. After this session is over, you will have time to see the sights, and above all the exposition of all expositions, and remember this, if a fog happens to come, that it is very unusual for us to have fogs; but sometimes something happens to blow it this way. You know sometimes things go wrong, and when all is said and done, you should believe that that fog is good for you. If you live in the valleys of California, you would see the

people coming down from Stockton and the San Joaquin Valley and Fresno, and as they approach the Bay breathing in the air and swelling up their chests and saying: "Isn't this fine!" They like our fogs, coming from the hot valleys. That is what they come here for. But you people, some of you, are seeing this country for the first time. They have been here many times. And they continue to come, because they find it all right. But there is always something about a first experience, like falling in love the first time—when you have been in love before, you know all about it—there is nothing new, but the first time, you don't know how it will turn out because that is the first time. Now this is new to all of you—you are seeing us for the first time, and I can see by the looks of some of you that you have been here before, for you have that happy, contented, satisfied, I-am-glad-I-came look after you have been here with us for a short time.

I thank you very much and I hope your meeting will be a very great success. (Applause.)

RESPONSE TO THE ADDRESS OF WELCOME BY DR. RUTHERFORD.

Mr. President, Ladies and Gentlemen: It has fallen to my lot to be present at two meetings of the A. V. M. A. in California. It has fallen to my lot to listen to a good many addresses of welcome, but I feel that the very first thing before attempting to reply to the eloquent remarks I have just heard, that I ought to compliment Mr. Capwell on having made one of the very best, if not the very best addresses of welcome I have ever had the pleasure of listening to, or that we have had extended to us.

I think you noticed as I did, the very remarkable play of Mr. Capwell's brain, the ease and quickness with which he thought, and the extraordinary rapid delivery of the ideas which came bubbling up as he went along. I don't know but what he has, to a certain extent, missed his avocation. He is not only a most pleasing public speaker, but, in view of the fact that there has as yet not appeared on the horizon any real, genuine, guaranteed successor to our great and lamented friend, Mike Flynn, I think we ought to elect Mr. Capwell for that position. Of course he could not help now and then giving himself away. You noticed that in telling us the one great object that we all must have in life was to visit California and that the other one was to get somewhere else, he didn't say where. I think if he had come with us through the Sacramento Mountains yesterday afternoon, he would have had even further doubt than the doubt which apparently exists in his mind as to which of those two places he

meant. I am sure he would have even greater doubt if he had gone through that inferno yesterday afternoon. Of course we know this particular Bay region is the merry-go-round region of California. We have heard of that a long time. Some of us have seen it before. But, Mr. Capwell, you are a little bit inconsistent when, after telling us California is heaven, you state it is necessary for these people of the inland valleys to come to the seashore to get some of the fog in order to maintain the life which the Lord had given them for a little time longer. Still I suppose the people of those valleys enjoy the heat, but they look forward to coming down to San Francisco or Oakland to get the fog much as we Easterners and Northerners look to California as a place that we ought to visit. There is no question about California being a great country. Any one who looks around here and considers what has happened in this state in the short time during which it has been in existence, is bound to admit that not only is California one of the greatest states in the American Union, but one of the greatest countries so far as natural wealth and natural productiveness is concerned in the whole world. And another thing: California has been remarkably fortunate in the sort of people who came here and settled. The first people who came were the adventurers, and for many years it was quite an adventure for a man to come to California. When you consider that the first news of the discovery of gold in California reached the United States by rumors sent to the Sandwich Islands, that to my mind throws the greatest possible light on the difficulties which only a few years ago surrounded the getting to California. When we consider what we have done in the past few days, leaving our homes in the far east and the far north, travelling on comfortable trains across beautiful lands, surrounded by every luxury and every comfort, it is difficult for us to conceive what the pioneers had to undergo in order to reach this country and begin the building up of it as they did, and to carry that building to so wonderful and grand a completion as they have already done. I don't mean to insinuate, Mr. Capwell, that your building is anywhere near completion yet, but it is going along beautifully. It is a wonderful country, and we concede that that native modesty which we have always noted is invariably displayed by the Native Sons of California in describing the beauties of this region, is fully justified by the facts. I don't think Mr. Capwell's enthusiasm is at all overdone, and I could see that struggling through that bashfulness and backwardness, there was the feeling that after all he was ready to do his

duty, to impress upon us as fully as possible, though delicately, to a certain extent, unwelcome as the task was to him, still he felt it his duty to expatiate to some extent at least on the advantages and beauties of this great country, and I am sure that in that effort so nobly made against his better nature, he impressed upon us by his earnestness, the feeling that the people of this region thoroughly sympathized with us outsiders.

I don't think it is necessary for me to say much more. We are constantly hearing from our friends who don't belong to the profession that our day is about done; that in the course of a few more years we shall all be hung up on the wall as back numbers; that the veterinarian will have nothing to do. Well may be—may be as far as medical treatment of the horse is concerned there will not be so much to do in the future as in the past. It is just as well for us as veterinarians to look frankly in the face of the situation. We may not have as many lectures in the future on the treatment of the horse, which has been largely the bulk of the work of the veterinarian hitherto, but when we consider the advances that are constantly being made in sanitary science; when we consider that we are only on the threshold of real sanitation in the matter of food supply; when we consider that without the highly trained scientific as well as practical veterinarian it is practically impossible to properly safeguard human life in the matter of food supply and other ways as well; it becomes apparent at once that there is a great future before the veterinary profession. Indeed, there is a much greater future before it and much greater opportunities than the past has ever given. It looks to me (and I am getting along in life fairly well now) as if all the work that has been done by the veterinary profession in the past has simply been a training, a preparatory work, an initiation and schooling for the great work which the veterinary profession has before it, which no other body in the world except the veterinary profession can properly and proficiently perform. So we need only have a momentary regret when we see the traffic motor cars going by with the heavy loads that our equine friends used to carry so laboriously and heroically, being moved as we see them with ease by motor machinery. We may have these regrets; at the same time, the field opening up to-day for the young, intelligent, enthusiastic and ambitious veterinarian is a much wider field and a much nobler field than that which has been occupied by the profession in the past. So, Mr. President, I don't think we need feel that our profession is doomed. I don't think we need feel any alarm or fear whatever as to our future.

Our future is sure, provided each and every one of us sets his ideals high enough; devotes himself to obtaining a thorough mastery of the details of his profession, or in other words, hitches his wagon to a star.

Now, Mr. Capwell, on behalf of the A. V. M. A. and you can see the class of people we are, I thank you for your hearty welcome. I thank you for welcoming us to Oakland and to the State of California, which we grant is the finest place in the world in spite of our natural doubts as to whether or not some parts of it was heaven or the other place. But joking aside, in spite of what I may say about the climate of Sacramento, there is no doubt at all in our minds that Mr. Capwell really meant that heaven is the only other place comparable to California. But I want to tell you one thing; that the state of California has had as much cholera and pneumonia as we have in our various locations. So maybe after all, we can do California some good in making suggestions.

Now we have come down here to be shown. We are going to take a good look at this place, and if we find it compares favorably with our ideals in regard to the other place, we may possibly determine to remain here, but not otherwise. I thank you.

(Applause.)

The annual presidential address was then delivered as follows:

PRESIDENT'S ADDRESS.

By C. J. MARSHALL, PHILADELPHIA, PENNA.

Since the last president of this association had the high honor of addressing this distinguished body, a succession of events has developed with startling suddenness—events which have exercised and will continue to exercise a profound influence on our association and on our profession.

The Great War in Europe, filling the entire world with the resounding clash of arms, coming up like a sudden tropical thunderstorm, abruptly put an end to the International Veterinary Congress that was to have met last August in London to celebrate the fiftieth year of its prosperous existence. Abounding hopes for the success of this congress and for the beneficial results that were expected to flow therefrom were dashed to earth. Racial and national animosities and hatreds have taken the place of good-will and hearty co-operation among those of our profession the world over. It is doubtful whether any but the youngest of us will live to see again prospects as alluring and encouraging

for international friendship and sympathy among veterinarians of all nations as obtained prior to this great international calamity.

Coming close after the beginning of the Great War followed the sudden outbreak of apthous fever in our own country. So sudden and so virulent was the attack that within the space of a few weeks the disease made its appearance in no less than twenty-three of our principal cattle-raising States. This plague, so dreaded among stock breeders, bid fair to become an international calamity, and it was necessary to mobilize promptly all available forces to check it. A large proportion of the membership of our association comes from the United States Bureau of Animal Industry, the Health of Animals and Livestock Branches, Department of Agriculture, Dominion of Canada, and those interested in State and Provincial Livestock Sanitary control work. Practically all such members and many others from the field of private practice were called upon to assist in the work of controlling and eradicating the disease, or to render national service in various ways in the European War. The work was so important and the call for assistance from our membership so extensive that it was deemed wise to cancel our annual meeting, which had been extensively advertised to be held in New Orleans the last week in December. As was true with the International Veterinary Congress, so it was with the American Veterinary Medical Association, that this course was decided upon after all preparations were completed. The disappointment fell especially heavy upon the local Committee of Arrangements, which in both cases had spent much time, money and effort in preparation. This is the first time in the history of the American Veterinary Medical Association, extending over a period of fifty years, that an annual meeting has been lost. By tremendous effort, courageous action and intelligent co-operation between the nation and the States the disease was mastered, although the struggle required seven months' time and an expenditure of nine million dollars. It was fortunate for the country that we have such an efficient and well organized body as the United States Bureau of Animal Industry. With the aid of this Bureau, helped by hundreds of other men from our profession, most satisfactory results were attained. A more stupendous task was never undertaken by our profession, nor has work by the profession been more fruitful in splendid results. Criticism there was of our methods, of course. There always is. But the results speak for themselves. We can complacently ask whether our critics could have done better in the same time with other methods and with our handicaps.

While the Federal Bureau pursued a wise course and should receive nothing but the highest praise, the same cannot be said of all the States. It is true they did what they could, but owing to lack of intelligent legislation, adequate appropriation and efficient organization, the work of eradication was beset with obstacles that prolonged the fight and made it more costly in the end. In many cases the State laws were absurdly inadequate. In many States the veterinarians were not so organized as to furnish the best and most efficient co-operation with the Federal forces. The burden, then, in some States was borne by the Bureau far more than in others. Few of the States have contributed money in the encouragement of veterinary education and hardly any have appropriated funds sufficient properly to study or to handle diseases of animals. When we realize what could be done to save livestock by the education of trained men, by proper legislation and by the appropriation of adequate funds to prevent, control and eradicate disease, and how vast is the monetary loss suffered annually through neglect on the part of the State governments, we wonder that the owners of livestock have not insisted that their interests be more carefully safeguarded by the legislatures of the several States.

And now while this outbreak of disease is fresh in our minds, a glance back over the history of the never-ending combat with animal diseases in this country may not alone be of interest but of value in emphasizing our shortcomings and our achievements.

Before taking up the discussion from an historic standpoint of State legislation, let us by way of appreciation say a word about the Federal Government. The Federal Bureau of Animal Industry was created in the Department of Agriculture by Act of Congress, approved May 29, 1884. The late and deeply lamented Dr. D. E. Salmon was appointed the first chief of the Bureau. He gave twenty-one of the best years of his life in organizing and developing the work of the Bureau. During his incumbency much was accomplished that is of permanent value to the livestock interests of the country and to our citizens in general. Among the many important things accomplished during his term of service might be mentioned the extermination of contagious pleuro-pneumonia, one of the worst cattle plagues known; the mystery in reference to the cause and prevention of Texas Fever was made clear; the establishment of a federal meat inspection not surpassed by any in the world; the instituting of a system of inspection of animals intended for export; quarantine and inspec-

tion of imported animals and a thorough system of scientific investigation of animals' diseases and their probable effect upon public health. Let us ever cherish the good work done by Dr. Salmon. Fortunately, the work of the Bureau carried on so long and faithfully by him was, on his removal, placed in competent hands, whereby its healthy progress has continued.

Not so much can be said for another branch of our national service. It is hard to understand why the Federal Bureau of Animal Industry has become so efficiently organized while the Army Veterinary Service remains so antiquated and inefficient.

Coming now to State legislation, we notice that in most cases the first attempt to suppress an outbreak of disease among animals was made locally. No effort was made, it is almost safe to say not thought of, to use the broader, vaster and more efficient powers of the State or National government. From time to time in some of the older States acts were passed allowing certain things to be done locally by way of preventing the spread of disease. In the East cattle and horses were the object of the greatest care at first; in the West sheep first, then cattle.

Most of the State Boards or Commissions have been established within the last twenty years. One of the earliest was, strange to say, the State of Colorado, which established a Veterinary Sanitary Board in 1885. Of course, other States had established Boards of Agriculture earlier than 1885, but the specific establishment of machinery to fight diseases of animals was made in only a few States prior to Colorado. Iowa provided in 1884 for a Veterinary Surgeon; Kansas for Sheep Inspector in 1883; Maryland for a Veterinary Inspector in 1885 and for a livestock Sanitary Board in 1886. In Massachusetts, up to 1862, the work was local. In that year a Cattle Commission was provided for, which by the acts of 1885, 1889, 1902 and 1912 became ultimately the Department of Animal Industry. Michigan provided in 1885 for a Livestock Sanitary Commission; Minnesota for a Board the same year, and Montana for a Territorial Veterinary Surgeon. New Jersey provided for local inspection in 1861. New York, with all her vast resources, did practically nothing as a State until 1878, when the Governor was given powers now wielded by the Bureau of Veterinary Service. Rhode Island as early as 1860 had a Board of Commissioners with limited powers. Vermont in 1880 had a Board of Cattle Commissioners, which by various changes has become the Livestock Commissioner (1913). Wisconsin, which legislated as early as 1852 for sheep and 1867 for horses provided in 1885 for the office of State Veterinarian; and

even Wyoming—typical then of the wild and woolly West, had by the Act of 1882 a Territorial Veterinarian.

Taking them by States and not chronologically the various State Boards or offices with their names were formed as follows: In each case it is a Livestock Sanitary Board unless otherwise indicated: Alabama, 1907; Arizona, 1897; Arkansas, 1905 (Veterinary Department, Agricultural Experiment Station, then, 1907, as the Board of Control of that Department); California, 1899 (State Veterinarian); Colorado, 1885 and 1908 (State Veterinary Sanitary Board); Connecticut, 1871 (State Board of Agriculture, then, 1895, Commissioners on Domestic Animals); Delaware, 1893 (State Board of Agriculture and State Veterinarian); Florida, 1909 (State Board of Health); Georgia, 1910 (State Veterinarian); Idaho, 1905; Illinois, 1887 (Board of Livestock Commissioners and State Veterinary Surgeon); Indiana, 1901 (State Veterinarian); Iowa, 1884 (State Veterinary Surgeon); Kansas, 1883 (Sheep Inspector, 1901-1905, Livestock Sanitary Commissioners); Kentucky, 1893 (State Board of Health, then, 1910, State Livestock Sanitary Board and County Livestock Inspectors); Louisiana, 1894 (Livestock Sanitary Commission, but name changed in 1908); Maine (State of Maine Cattle Commission, then, 1911, Livestock Sanitary Commission); Maryland, 1885 (Veterinary Inspector, then in 1886 and 1888 Board); Massachusetts, 1912 (Department of Animal Industry); Michigan, 1885 (Livestock Sanitary Commission); Minnesota, 1885; Mississippi, 1908; Missouri, 1887 (State Veterinary Surgeon under the State Board of Agriculture); Montana, 1885 (Territorial Veterinary Surgeon, then, 1887, Stock Commissioners, 1907 Board); Nebraska, 1901 (State Veterinary Surgeon, 1913, Board); Nevada, 1895, (State Board of Health, 1905, State Veterinarian 1907, State Sheep Commission); New Hampshire, 1891 (State Board of Cattle Commissioners); New Jersey, 1886 (State Board of Health); New Mexico, 1889 (Cattle Sanitary Board, 1897, Sheep Sanitary Board); New York, 1878 (Governor as sole instrument, then, 1893, Commissioner of Agriculture, then, 1901, Bureau of Veterinary Service—Chief Veterinarian, etc.); North Carolina, 1889, 1901 (Commissioner of Agriculture); North Dakota, 1887 (District Veterinarians, 1895, Chief State Veterinarian, 1891, Sheep Inspectors, 1907, Board); Ohio, before 1888 (Board of Livestock Commissioners, 1902, State Board of Agriculture—with State Veterinarian, 1913, Agricultural Commission); Oklahoma, 1897 (Livestock Sanitary Com-

mission, 1901, reformed, 1907, State Board of Agriculture); Oregon, 1891 (Domestic Animals Commission, 1907 Board of Sheep Commissioners, 1909, State Board of Health, 1911, Board); Pennsylvania, 1895; Rhode Island, 1860 (Board of Commissioners, 1892, State Board of Agriculture); South Carolina, 1890 (State Board of Agriculture); South Dakota, 1887 (State Veterinary Surgeon, 1905, 1909, 1913, Board); Tennessee, 1885 (Livestock Sanitary Commission; 1893, State Veterinarian appointed by the State Board of Health, 1901, State Livestock Inspector, 1913, State Veterinarian with Commissioner of Agriculture and County Board of Health); Texas, 1893 (Livestock Sanitary Commission—appoints State Veterinarian); Utah, 1898 (Dairy and Food Commission, 1903, Sheep Commissioners, 1907, Horse Commissioners, 1909, State Veterinarian, 1911, State Department of Livestock); Vermont, 1880, 1902, 1906, 1911, Board of Cattle Commissioners, 1892, State Board of Agriculture, 1913, Livestock Commissioner); Virginia, 1896, 1903 (Board of Control of the Experiment Station of the Virginia Agricultural and Mechanical College, 1908, Board); Washington, 1895 (State Veterinarian); West Virginia, 1891, 1897 (State Board of Agriculture); Wisconsin, 1885 (State Veterinarian (Governor), 1901, Board); Wyoming, 1882 (Territorial Veterinarian, 1899, State Board of Sheep Commissioners).

Coming to another phase of our legislation, let us dwell for a moment on the laws governing the standards of efficiency set for those who—and who alone—are able to carry on this battle intelligently—that is to say, the members of the noble profession of veterinary medicine. Out of the entire number of States but twenty-six, or two more than half, provided for an educational qualification for veterinarians. The earliest States to legislate on this subject were New York (1886), Wisconsin (1887), New Jersey and Pennsylvania (1889). During the decade from 1890 to 1900 but three States were added to these: Ohio (1894), North Dakota (1895), and Virginia (1896). In the next five years but one more fell into line—Iowa in 1900. From 1900 to 1905, Connecticut (1905), Maine (1905), Missouri (1905), North Carolina (1903) and Tennessee (1905) joined their sisters. Since 1905 progress has been more rapid and there have been as many new States added to this list as there were before, namely, California (1911), Georgia (1908), Idaho (1913), Kansas (1907), Michigan (1907), Montana (1913), Oklahoma (1913), Rhode Island (1909), South Dakota (1909), Texas

(1911), Utah (1907), Vermont (1912), and Washington (1907).

Leaving the consideration of the laws governing animal hygiene and the practice of veterinary medicine in the Dominion of Canada and other countries represented in our membership to those more familiar with local conditions, even a slight study of the diversified legislation scattered through forty-eight States discloses the great inaptitude with which the problems have been approached. Powers grudgingly given, jealously curtailed, ignorantly divided and weakened, spell a tale through the years of futility, ignorance and sordid greed. With great problems to solve, with great issues to be met, with great obstacles to be overcome, with great results offered for the taking—with all these things throughout our many States these many years—what are the results—a mass of incoherent, unsystematic, insufficient legislation, lacking in homogeneity and wanting in uniformity. Instead of co-operation between and among the States to eradicate disease among our domestic animals, there have been nothing but indifference and well-nigh hostility. One State has recognized another only so far as to suspect it of harboring disease within its borders and to erect against it a Chinese wall of inhibited importation. Instead of systematic co-operation with resulting efficiency and economy of administration we practically prolong the struggle against disease by a narrow insularity of feeling and action. When the day dawns in this grand nation of ours whereon one State will fight shoulder to shoulder with her sister States against the dreaded foes of animals, then, and not until then, will the solution of the problem be in sight. Far better were it if the Federal Government were allowed a free hand from the Atlantic to the Pacific and from Canada to the Gulf than the present crude and bungling and chaotic legislation and administration. It is true that one State has problems to solve that the others do not have—that the great diversity of our climate and of our soil complicate the question to an extraordinary degree; but for all that, let us urge upon the lawmakers in all of our States to recognize disease as a common foe to be fought with might and main—not singly, but in a hearty co-operation, if the years to come are to note any advance in the struggle.

It seems as though these problems are for our profession and our association to solve. The task is great, the obstacles many, but what gratifying results lie at the end of the work! Education alone can do it—education of the individual, educa-

tion of officials, education of legislatures. Awaken the States to a realization of the immense annual loss and the intuition of the average man will do the rest.

It will require an heroic effort on the part of the officers and members of this association to maintain the healthy growth and progress that has been so characteristic of the past. We should aim to do more. For some time it has been felt that the magnitude and importance of the work of the association has grown beyond the scope of the constitution and by-laws under which it was organized. The time appears ripe for re-organization. This work is of vast importance and all moves should be thoughtfully, cautiously and intelligently made. For several years the committee on re-organization has been considering the subject. Plans were submitted at our last meeting. The further deliberations of the committee will be presented at this meeting and it is hoped that some definite action may be taken to bring about the re-organization as rapidly as safety will permit.

Let us consider also plans for publishing our annual report and see if it is not possible to make a more satisfactory and economical arrangement. Under the present plan each annual report costs the Association about \$5,000. Would it not be cheaper and more useful to publish the report in the form of a bulletin? This would bring about a saving in the distribution of announcements. A large portion of the expense of the publication might be defrayed by revenues incidental to the publication.

The American Veterinary Medical Association has rendered valuable service in the past in developing veterinary science. Education is the foundation of our profession. The schools should continue to receive our most careful consideration, and the meritorious work undertaken by the Bureau of Animal Industry in classifying these institutions and bringing them up to a prescribed standard of efficiency should be heartily endorsed and carried still further by this Association. We should not be satisfied till each of them maintains a standard of at least four-years-high-school entrance requirements and four standard academic years of professional training. When our ranks are filled with men that have been equipped with a thorough education, it may be possible to get the recognition that our profession deserves.

We have done much in the past, let us resolve to do more in the future. Then, when the work is done, when the results come in abundance we can rest content that we have done our duty and have done it to the fullest measure. (Applause.)

REPORT OF THE SECRETARY.

More than fifty years have elapsed since the organization of this association; a half century that has witnessed greater progress in all lines of human endeavor than has any century in the written history of the world. It is probable that our profession has kept pace with this wonderful change, yet the American Veterinary Medical Association is to-day working on practically the same lines it did when it was organized fifty-two years ago.

Fifty years ago there were few if any veterinary associations and the American Veterinary Medical Association supplied that need. To-day practically all of the states and provinces have associations. Many of them have district associations and there are also scores of county or similar local associations. These have their own important field of usefulness, quite different than that of the American Veterinary Medical Association.

There is a great and growing need for work along national and international lines. The outbreak of foot-and-mouth diseases has stimulated public interest in the question of the protecting the great live-stock interests of all North America that means so much to the welfare of the people. The interests of the veterinarian and the stockman are inseparable.

There is a growing demand for better trained veterinarians, and one state at least has enacted laws requiring the state and assistant state veterinarians to be graduates of colleges recognized by this association. The public naturally and properly looks to the American Veterinary Medical Association not only to set the standards of qualifications for veterinarians but to be the leading spirit in everything pertaining to our profession. This association should assume this responsibility and leadership.

I would recommend that this association be incorporated. It will probably cost from \$50.00 to \$75.00 for incorporation and attorney fees. Good business practice would demand that this be done at once.

The publication of the proceedings of this association now requires a large volume and the expense of publication is great with no financial return. I recommend that the proceedings of this association be published in a monthly official journal. Such journal would greatly increase the influence and standing of this association and if properly carried out would prove a source of revenue.

A journal of this kind would not only afford an opportunity of keeping the members in touch with one another and with problems of importance to the profession, but it would officially

represent this association before the laity and other associations having interests similar to or related to ours.

So far as I can determine, there is no other association the size of this, that is national or international in character but that publishes an official journal.

In discussing this subject with some of the staff of the journal of the American Medical Association, they called attention to the perfunctory work and relatively small influence of that association before it published an official journal. When an official journal was established the American Medical Association grew rapidly in size and influence. It has been estimated that with an official journal the membership of our association could be doubled in two years.

Only those who have had the experience realize how little there is at present to keep up an interest in the association, to attract new members or bind the members of this association together. There are the annual meeting, the published proceedings and the notices to pay their dues.

During the past two years form letters have been sent out to all members every few months. These have been of value in keeping up interest in the association. Your secretary has also had the opportunity of attending a number of veterinary association meetings in Michigan, Wisconsin, Minnesota, Illinois, Indiana, Missouri, Iowa, Alabama, Nebraska and Kansas, without expense to the association and I think that the opportunity to present the advantages of the American Veterinary Medical Association has been helpful to all.

A change has been made in the method of receipting for dues paid. Instead of returning the receipted statement, a regular printed detachable receipt is now used, as the receipt stub furnishes an additional check on the accounts.

A special effort has been made to collect delinquent dues. Statements have been sent on which have been stamped "second," "third" and "fourth notice" and "don't forget." These have been fairly successful.

The amount of outstanding dues has been reduced to about one-half that reported two years ago at this time.

It is probable that the greater portion of this can be collected. The amount received by the secretary during the past two years to August 20th, 1915, is as follows:

Dues	\$9,189.84
Application for membership	1,936.00
Other sources	30.00
Total	\$11,155.84

There is before the association an amendment to raise the dues from \$3.00 to \$5.00 per year that should receive your careful consideration. The financial report that is presented by the treasurer to the annual meeting may convey a wrong impression as to the state of the treasury. You must bear in mind that this report is made just after the dues have been paid and before any of the expenses for the year have been paid. Your officers have personally assumed the responsibility for some three thousand dollars on account of the last published proceedings. The total expense of publishing and distributing the 1913 proceedings being about \$4,500.00. Knowing something of the task involved in collecting the \$3.00 dues, I hesitate to recommend the increase but if the association is to grow and meet the demands as it should, more funds are needed.

I would recommend that all resolutions appropriating money be first referred to the Finance Committee for their approval. Your secretary has tried to give careful conservative attention to the affairs of the association and in doing so has been somewhat embarrassed by acting contrary to a vote of this association, but the condition of the treasury made it necessary.

Two years ago the association voted to have the report of the committee on Veterinary Anatomical Nomenclature printed and distributed to all members of the association before the annual meeting. This report which had been carefully prepared by the committee consisted of sixty-two typewritten pages of Latin anatomical names and republishing those names printed on pages one hundred and ninety-two to two hundred and twenty-five of the 1913 report. As the Secretary did not wish to take the responsibility and asked the Executive Committee to decide the matter. Considering all the circumstances the Executive Committee decided not to publish this complete committee report in advance of the general report.

This association should decide whether papers already presented publicly should be given a place on our program and also whether or not papers presented before this association should not become the property of this association for first publication only in the official proceedings.

Another important matter that should receive your consideration is a Committee on Program. At the present time the Secretary is responsible for this. In the present occasion he has the great help of the directors of the sections who have taken most of the responsibility. There may be cases when some individuals wish to take advantage of the association to exploit cer-

tain subjects for selfish purposes. All papers to be presented before this association should first be submitted to a Committee on Program for approval. Such a committee should also decide the policy as to the general character of the program to be presented and thus relieve the Secretary of a portion of the responsibility that is now his alone.

This association has received through the Honorable Secretary of State for the United States of North America an invitation to send one or more delegates to the Second Pan-American Scientific Congress to be held in Washington, D. C., December 27th, 1915, to January 8th, 1916. At the request of your Secretary the committee having charge of the preparation of the program has arranged to have the subject of the control of transmissible diseases of animals placed on the program. This is an important subject particularly to the Latin-American countries.

I would recommend that one or more delegates be sent to this Congress. The American Pharmaceutical Association also asked this association to send a delegate. Dr. Milks, who was appointed by President Marshall will report at this meeting.

There is a rapidly growing tendency toward a closer relation between the various national and international scientific associations and I would recommend that this association make provision to extend invitations to other associations that may be interested in some phase of our work, to send delegates to our annual meetings and that we also send delegates to other associations the work of which we are somewhat interested in some phase. Such an arrangement will broaden our work, and influence and stimulate the growth of more intimate and friendly relations and prove mutually helpful.

The Rockland County (New York) Veterinary Medical Association has requested this association to adopt officially some distinctive emblem for the veterinary profession similar to the red cross in human medicine. Such an emblem could be attached to vehicles or worn as a pin. They suggested the blue cross. This idea has been on request presented by me to the Missouri Valley Veterinary Association, the Illinois and Missouri Veterinary Medical Associations and has been favorably received.

I recommend the adoption of such an emblem and also of an official pin, badge or button for the members of this association. Suggestions regarding these are also submitted.

The following members have gone on the honor roll after twenty-five years continuous membership:

In 1914—Drs. Cooper Curtice, H. P. Eves, G. D. Fair, A.

D. Melvin, and in 1915—Drs. H. B. Ambler, A. H. Baker, C. A. Cary, R. W. Hickman, Geo. A. Johnson, C. D. McMurdo, W. H. Richards, Walter Show, Sesco Stewart, H. N. Waller, F. E. White.

RESIGNED.

Barnett, Jos. A., Edwardsville, Ill. Belaire, Geo. H., Pembroke, Can. Bretz, S. E., Nevada, Ohio. Brown, Chas. W., Berkeley, Cal. Fry, E. S., Naperville, Ill. Hope, J. G., U. St. Yds., Chicago, Ill. Mossie, J., Kingston, Ont., Can. Morrison, Wm., Los Angeles, Cal.

DECEASED.

Archer, John B., Spencer, Ind. Bridge, Francis, Philadelphia, Pa. Devoe, W. S., Philadelphia, Pa. Kolb, Ed. L., Rochester, Minn. Koto, Paul C., Forrest City, La. Leffingwell, M. D., Austin, Minn. Mumma, Ed. W., Lexington, Ky. Nicholson, John W., Chicago, Ill. Osgood, F. H., Boston, Mass. Parker, Chas. D., Monticello, Minn. Paxon, H. D., Chicago, Ill. Patton, D. W., Omaha, Nebr., May 27th, 1914. Brown, Art. C., San Francisco, Cal. Robertson, James, November 26th, 1913. Richardson, Francis T., Fallon, Nevada. Salmon, D. E., Butte, Mont. Small, Antony W., Hayward, Cal. Stults, Clinton L., Ft. Worth, Tex., B. A. I. Sugden, B. A., Montreal, Can. Cook, Louis P., Cincinnati, Ohio. Dryden, Wm. A., Columbus, Indiana. Smith, Henry S., Albion, Mich. Walrod, Geo., Storm Lake, Iowa. McHenry, Walter, Marion Center, Pa.

MISSING.

Burns, Geo. H., Sioux Falls, S. Dak. Hammond, R. R., Cherokee, Ia. Lender, Chas. A., Morgantown, W. Va. McClosky, Jas. A., Philadelphia, Pa. Potter, Geo. E., Pittsburg, Pa. Ralston, W. E., Pullman, Wash. Stephens, S. H., Norwood, Ohio. Thurston, Warren B., Mara, Minn. Wallace, Wm. B., Marion, Ind. Wundle, Thos. T., Oxnard, Cal.

COMMUNICATIONS MAILED.

During the past two years 17,000 pieces of first-class mail have been sent out from the Secretary's office and one thousand postal cards—not including return-vote postal cards.

In conclusion, I wish to thank the members of the association for their cordial assistance, that has been so helpful and has been greatly appreciated.

Respectfully submitted,

N. S. MAYO, Secretary.

REPORT OF TREASURER.

RECEIPTS FOR 1913, '14, '15.

1913.		
Sept. 5,	Balance in bank as per last report.....	\$3,162 23
Sept. 5,	Received from C. J. Marshall, Secretary.....	55 00
Sept. 5,	Received from C. J. Marshall, Secretary.....	40 00
Dec. 25,	Received from N. S. Mayo, Secretary.....	1,801 25
1914.		
Jan. 3,	Received from N. S. Mayo, Secretary.....	97 00
May 5,	Received from N. S. Mayo, Secretary.....	700 00
July 1,	Received from N. S. Mayo, Secretary.....	400 00
Sept. 18,	Received from N. S. Mayo, Secretary.....	1,700 00
Nov. 26,	Received from N. S. Mayo, Secretary.....	1,200 00
Dec. 8,	Received from N. S. Mayo, Secretary.....	1,030 00
1915.		
Jan. 2,	Received from N. S. Mayo, Secretary.....	611 30
Feb. 28,	Received from N. S. Mayo, Secretary.....	350 00
May 14,	Received from N. S. Mayo, Secretary.....	400 00
Aug. 7,	Received from N. S. Mayo, Secretary.....	874 70
Total receipts, 1913, '14, '15.....		\$12,301 57

DISBURSEMENTS FOR 1913, '14, '15.

1913.		
Sept. 5,	To M. P. Ravel, Madison, Wis., for expenses to New York meeting.....	\$55 00
Sept. 5,	To Chas. F. Roberts, New Haven, Conn., for stenographic services in reporting New York meeting (on account)	200 00
Sept. 11,	To C. J. Marshall, Philadelphia, Pa., for stenographic work, stamps, telegrams and salary.....	570 93
Sept. 11,	To Clarissa B. Coburn, Philadelphia, Pa., for stenographic services, by C. J. Marshall, Secretary.....	54 00
Sept. 11,	To Johnson & Prince, Philadelphia, Pa., for duplicating letters, by C. J. Marshall, Secretary.....	4 10
Sept. 11,	To John S. Pollard, Providence, R. I., for expenses as Resident Secretary, 1912-13.....	30
Sept. 11,	To I. D. Fair, Millersburg, Ohio, for expenses as Resident Secretary, 1912-13.....	10 81
Sept. 11,	To R. P. Marsteller, College Station, Texas, for expenses as Resident Secretary, 1912-13.....	1 00
Sept. 11,	To David F. Fox, Sacramento, Cal., for expenses as Resident Secretary, 1912-13.....	11 25
Sept. 11,	To I. E. Newsom, Fort Collins, Colo., for expenses as Resident Secretary, 1912-13.....	10 00
Sept. 11,	To W. W. Dimock, Ames, Iowa, for expenses as Resident Secretary, 1912-13.....	7 31
Sept. 11,	To J. F. DeVine, Goshen, N. Y., for expenses as Resident Secretary, 1912-13.....	22 75
Sept. 11,	To F. H. Mackie, Baltimore, Md., for expenses as Resident Secretary, 1912-13.....	1 00
Sept. 11,	To J. T. Seely, Seattle, Wash., for expenses as Resident Secretary, 1912-13.....	2 50
Sept. 11,	To C. C. Clarke, Washington, D. C., for typewriting by Dr. John R. Mohler.....	17 85
Sept. 15,	To Hon. E. C. Snider, Washington, D. C., for expenses as banquet speaker.....	40 00

1913.		
Sept. 15,	To Robert W. Ellis, New York, N. Y., for cablegram to Dr. A. Liautard, Paris, France.....	11 15
Sept. 15,	To Francis S. Alley, Nashua, N. H., for expenses as Resident Secretary, 1912-13.....	5 00
Sept. 15,	To F. F. Brown, Kansas City, Mo., for expenses as Resident Secretary, 1912-13.....	12 50
Sept. 15,	To W. Dean Wright, Portland, Wash., for expenses as Resident Secretary, 1912-13.....	95
Sept. 15,	To Samuel H. Burnett, Ithaca, N. Y., expenses as Librarian, 1912-13	23 66
Sept. 15,	To G. W. Dumphy, Detroit, Mich., for expenses as member Committee on College Investigation.....	6 00
Sept. 15,	To E. B. Ackerman, Brooklyn, N. Y., for expenses as member Committee on Glanders.....	30 00
Sept. 26,	To Septicus Sisson, Columbus, Ohio, for expenses on account of Committee on Revision of Veterinary Anatomical Nomenclature	53 50
Oct. 10,	To David Cochran, New York, N. Y., for expenses incurred at Fiftieth Anniversary Meeting.....	100 00
Oct. 23,	To John W. Spence, Philadelphia, Pa., for stationery, printing, etc.	779 40
Oct. 23,	To W. Horace Hoskins, Philadelphia, Pa., for one-fourth appropriation for use of Committee on Legislation	250 00
Oct. 23,	To Caldwell-Sites Co., Roanoke, Va., for stationery and postage	1 57
Oct. 23,	To M. H. Reynolds, St. Paul, Minn., for expenses as member Committee on College Investigation.....	42 45
Oct. 23,	To M. H. Reynolds, St. Paul, Minn., for expenses as member Committee on College Investigation.....	7 95
Oct. 23,	To Louise Strychllemer, Columbus, Ohio, for stenographic services, by Dr. Sisson.....	5 25
Oct. 23,	To Elizabeth A. Murphy, Detroit, Mich., for stenographic services for Committee on College Investigation	24 50
Oct. 23,	To Miss C. J. Crawford, Blacksburg, Va., for stenographic services	12 75
Oct. 23,	To Samuel D. Holt, Philadelphia, Pa., for engrossing Honorary Membership Certificates.....	10 00
Nov. 3,	To F. H. Schneider, Philadelphia, Pa., for expenses as Resident Secretary	15 90
Nov. 3,	To Chas. F. Roberts, New Haven, Conn., for expenses and services in suit against Association.....	21 40
Nov. 23,	To Clarissa B. Coburn, Philadelphia, Pa., for stenographic work, by C. J. Marshall.....	59 14
Nov. 23,	To American Journal Veterinary Medicine, Chicago, Ill., for 250 reprints "New Committees A. V. M. A."....	2 50
Nov. 23,	To N. S. Mayo, Secretary, Chicago, Ill., for stamps, expressage, printing and salary for two months.....	120 90
Nov. 23,	To R. P. Lyman, Lansing, Mich., for amount paid F. W. Chamberlain, for assistance in preparing Minutes for publication	25 00
Nov. 23,	To Kenfield-Leach, Printers, Chicago, Ill., for envelopes and letterheads	49 00
Nov. 23,	To Chas. F. Roberts, New Haven, Conn., for 56 folios, Proceedings of the Fiftieth Annual Meeting.....	8 40
Nov. 23,	To Title Guarantee & Surety Co., Washington, D. C., for premium on Secretary's bond.....	8 75
Dec. 13,	To Williams Printing Co., Nashville, Tenn., for 1,500 copies Treasurer's Report.....	38 25

1913.		
Dec. 13,	To G. R. White, Nashville, Tenn., for expenses as Treasurer to September 1, 1913.....	8 00
Dec. 13,	To John W. Spence, Philadelphia, Pa., for stationery and printing, by C. J. Marshall.....	2 50
Dec. 13,	To Johnson & Prince, Philadelphia, Pa., for duplicating letters	4 50
Dec. 13,	To Geo. H. Glover, Fort Collins, Colo., for postage, etc.	2 50
Dec. 13,	To G. E. Noble, Boise, Idaho, for expenses as Resident Secretary, 1912-13	8 00
1914.		
Jan. 6,	To Chas. F. Roberts, New Haven, Conn., for balance due on stenographic services, New York Meeting....	173 64
Jan. 8,	To C. J. Marshall, Philadelphia, Pa., for expenses as Secretary, etc.	152 44
Jan. 8,	To A. J. Tupa, St. Paul, Minn., for stenographic services, Committee on College Investigation.....	33 38
Jan. 8,	To A. W. Goldsmith, Philadelphia, Pa., for card cases..	82 30
Jan. 8,	To W. J. Coates, New York, N. Y., for floral wreath (Dr. Robinson)	8 00
Jan. 8,	To Kenfield-Leach Co., Chicago, Ill., for stationery, by Secretary Mayo	128 38
Jan. 12,	To M. H. Reynolds, St. Paul, Minn., for expenses as member Committee on College Investigation.....	12 92
Jan. 12,	To J. R. Mohler, Washington, D. C., for postage and expressage on Annual Reports.....	662 00
Jan. 28,	To Abbott Alkaloidal Co., Chicago, Ill., for multigraphing 500 letters.....	1 75
Jan. 28,	To N. S. Mayo, Chicago, Ill., for expressage, stamps, telegrams, etc.	17 00
Jan. 28,	To Conrad Hoffman, Rockville, Md., for fees and dues returned	8 00
Jan. 28,	To Kenfield-Leach Co., Chicago, Ill., for envelopes and letterheads	3 25
Jan. 28,	To N. S. Mayo, Chicago, Ill., for salary.....	100 00
Feb. 11,	To M. H. Reynolds, St. Paul, Minn., for expenses as member Committee on College Investigation.....	186 74
Feb. 11,	To E. B. Ackerman, Brooklyn, N. Y., for expense as member Committee on Glanders.....	83 05
Feb. 11,	To Isabel McNeal, Columbus, Ohio, for typewriting report Committee on Anatomical Nomenclature.....	1 00
Feb. 11,	To John W. Spence, Philadelphia, Pa., for 500 letterheads and envelopes.....	3 25
Feb. 11,	To Kenfield-Leach Co., Chicago, Ill., for printing statements and application blanks.....	14 00
May 6,	To Frank G. Atwood, New Haven, Conn., for fees and dues returned	8 00
May 6,	To Kenfield-Leach Co., Chicago, Ill., for 3,000 application blanks	12 25
May 6,	To N. S. Mayo, Chicago, Ill., for stamps and circular letters	25 00
May 6,	To S. A. McQueen & Co., Philadelphia, Pa., for mounting 20 medals and engraving brass plates,	78 00
May 6,	To John W. Spence, Philadelphia, Pa., for stationery and printing, by Dr. Hoskins.....	12 00
May 6,	To Frank A. Ingram, Hartford, Conn., for fees and dues returned	8 00
May 6,	To Charles Schmitt, Dodgeville, Wis., for fees and dues returned	8 00
May 6,	To N. S. Mayo, Chicago, Ill., for two months' salary as Secretary	100 00

1914.		
May 6,	To D. McCuaig, McAdam Junction, N. B., for expenses as Resident Secretary.....	3 75
May 6,	To N. S. Mayo, Chicago, Ill., for stamps, envelopes, letter file, cashbook, etc.....	9 10
May 6,	To Green, Stalkner & Lake, Reno, Nev., for stationery, by W. B. Mack, Resident Secretary.....	7 00
May 6,	To L. H. Howard, Boston, Mass., for floral wreath (Dr. Osgood)	10 00
May 6,	To Kenfield-Leach Co., Chicago, Ill., for 300 membership cards	3 25
May 6,	To N. S. Mayo, Chicago, Ill., for stenographic services, etc.	50 60
May 6,	To N. S. Mayo, Chicago, Ill., for two months' salary...	100 00
May 6,	To Wm. J. Dornan, Printer, Philadelphia, Pa., for partial payment on printing Proceedings.....	1,000 00
May 6,	To Kenfield-Leach Co., Chicago, Ill., for, by L. A. Merillat	3 50
May 11,	To State Trust Co., Nashville, Tenn., for cheque book..	4 50
May 11,	To S. A. MacQueen & Co., Philadelphia, Pa., for framing two medals and engraving same.....	7 50
Sept. 18,	To Wm. J. Dornan, Printer, Philadelphia, Pa., for partial payment on printing Proceedings.....	1,500 00
Sept. 18,	To Hull & Reeve, Washington, D. C., for services rendered Committee on Legislation.....	200 00
Nov. 3,	To Triple Printing Co., Chicago, Ill., for printing receipt blanks	11 00
Nov. 3,	To S. Sisson, Columbus, Ohio, for expense as member Committee on Anatomical Nomenclature.....	21 00
Nov. 3,	To A. A. Etienne, Montreal, Canada, for expenses as Resident Secretary	6 75
Nov. 3,	To Wm. J. Dornan, Philadelphia, Pa., for reprints Report of Committee on Glanders.....	7 00
Nov. 3,	To Wm. J. Dornan, Philadelphia, Pa., for balance due for printing Proceedings New York Meeting.....	934 98
Nov. 3,	To G. W. Dumphry, Rochester, Mich., for expense as member Committee on College Investigation.....	42 00
Nov. 3,	To Kenfield-Leach Co., Chicago, Ill., for printing, by N. S. Mayo, Secretary.....	10 00
Nov. 3,	To J. T. Seely, Seattle, Wash., for expenses as Resident Secretary	8 75
Nov. 3,	To Triple Printing Co., Chicago, Ill., for printing, by N. S. Mayo, Secretary.....	11 50
Nov. 3,	To John W. Spence, Philadelphia, Pa., for printing, by Dr. Hoskins	3 00
Nov. 3,	To N. S. Mayo, Chicago, Ill., for cablegram to Sir John McFadvean	2 10
Nov. 3,	To A. M. Farrington, Washington, D. C., for floral design (Dr. Salmon).....	10 00
Nov. 3,	To N. S. Mayo, Chicago, Ill., for postage, etc.....	80 15
Nov. 11,	To Abbott Alkaloidal Co., Chicago, Ill., for multigraphing letters, by Secretary Mayo.....	4 55
Nov. 11,	To American Surety Co., New York, N. Y., for premium on Secretary's bond.....	8 75
Nov. 13,	To the O'Donnell-Brunley Co., Chicago, Ill., for application blanks	5 00
Dec. 10,	To Wm. J. Dornan, Philadelphia, Pa., for discount and interest	55 68
Dec. 10,	To R. R. Dyksta, Manhattan, Kansas, for expenses as Resident Secretary	6 92

1914.		
Dec. 10,	To John R. Mohler, Washington, D. C., for salary and expenses as Chairman Publication Committee.....	324 55
Dec. 15,	To Philadelphia Flower Shop, Philadelphia, Pa., for floral wreath	10 00
Dec. 15,	To A. H. Cheney, Polston, Mont., for expenses as Resident Secretary	5 00
Dec. 15,	To M. A. Sherman, Chicago, Ill., for envelopes, by N. S. Mayo, Secretary.....	4 50
Dec. 19,	To N. S. Mayo, Chicago, Ill., for salary as Secretary...	350 00
Dec. 19,	To M. H. Reynolds, St. Paul, Minn., for expenses as member Committee on College Investigation.....	1 75
Dec. 19,	To M. A. Sherman, Chicago, Ill., for printing, by Secretary Mayo	3 00
Dec. 28,	To C. J. Marshall, Philadelphia, Pa., for 2,000 double postal cards	10 00
Dec. 28,	To Johnson & Prince, Philadelphia, Pa., for printing and addressing postal cards, by Dr. Marshall.....	12 41
Dec. 28,	To John W. Spence, Philadelphia, Pa., for letterheads, by Dr. Hoskins.....	4 75
1915.		
Jan. 2,	To N. S. Mayo, Chicago, Ill., for salary as Secretary...	200 00
Jan. 2,	To N. S. Mayo, Chicago, Ill., for stamps, stationery, etc.	50 47
Jan. 13,	To W. Horace Hoskins, Philadelphia, Pa., for expenses, Committee on Legislation.....	250 00
Feb. 5,	To N. S. Mayo, Chicago, Ill., for stamps, stationery, etc.	63 91
Feb. 5,	To M. A. Sherman & Son, Chicago, Ill., for printing, postal cards, etc.....	5 50
Feb. 5,	To Geo. E. Ellis, St. Joseph, Mo., for fees and dues returned	8 00
Feb. 5,	To W. Horace Hoskins, Philadelphia, Pa., for expenses of Committee on Legislation.....	250 00
Feb. 5,	To R. P. Maisteller, College Station, Texas, for expenses as Resident Secretary.....	1 15
Feb. 5,	To Abbott Alkaloidal Co., Chicago, Ill., for multigraphing letters	3 75
Mar. 13,	To Triple Printing Co., Chicago, Ill., for membership cards	8 45
Apr. 19,	To M. A. Sherman & Sons, Chicago, Ill., for printing, stationery, by N. S. Mayo, Secretary.....	30 00
Apr. 19,	To M. H. Reynolds, St. Paul, Minn., for expenses as Chairman Committee on College Investigation.....	140 41
Apr. 19,	To D. M. Campbell, Evanston, Ill., for expenses as member Committee on College Investigation.....	30 82
May 4,	To W. Horace Hoskins, Philadelphia, Pa., for balance of appropriation due Committee on Legislation.....	30 75
May 22,	To N. S. Mayo, Chicago, Ill., for expenses incident to office as Secretary.....	48 00
May 22,	To N. S. Mayo, Chicago, Ill., for payment on salary....	100 00
May 24,	To J. D. Fair, Millersburg, Ohio, for expenses as Resident Secretary	6 50
May 24,	To Holmes County Farmer, Millersburg, Ohio, for stationery, etc., by J. D. Fair, Resident Secretary.....	5 00
May 29,	To G. R. White, Nashville, Tenn., for incidental expenses as Treasurer to date.....	8 50
June 16,	To Frederick H. Schneider, Philadelphia, Pa., for expenses as Resident Secretary.....	23 75
June 16,	To M. A. Sherman & Sons, Chicago, Ill., for printing application blanks, by N. S. Mayo, Secretary.....	5 00
June 26,	To E. T. Baker, Moscow, Idaho, for expenses as Resident Secretary	10 50

1915.	
June 29, To D. McAlpine, Brockville, Canada, for expenses as Resident Secretary	5 10
July 12, To J. A. Kirnan, Boston, Mass., for expenses as Resident Secretary of Tennessee.....	1 75
July 12, To D. M. Campbell, Evanston, Ill., for "ad" in Journal	2 20
Total expenditures, 1913-14-15.....	\$11,199 30
Total receipts	\$12,391 57
Total expenditures	11,199 30
Balance in bank.....	\$1,192 27

Respectfully submitted,

GEORGE R. WHITE, *Treasurer*,
OAKLAND, CALIFORNIA, August 30, 1915.

Finance Committee, American Veterinary Medical Association:

GENTLEMEN—This certifies that G. R. White, Treasurer, has \$1,192.27 on deposit at the State Bank & Trust Co. to the credit of the American Veterinary Medical Association.

H. VANTREASE, *Asst. Cashier*.

Nashville, Tenn., August 20, 1915.

REPORT OF FINANCE COMMITTEE.

To the Officers and Members of the American Veterinary Medical Association:

Your committee on finance have carefully examined and audited the books of the Secretary and Treasurer and find same to be correct as per card index and vouchers and the report of the officers as submitted.

GEORGE H. HART.
F. H. SCHNEIDER.
GEO. W. DUNPHY.

REPORT OF THE LIBRARIAN.

The report of the librarian covers the period from August 1913 to August 1915.

The number of copies of the proceedings received with the number distributed and those now on hand is shown in the following table:

	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
On hand or Rec'd.	10	13	86	7	153	145	183	251	63	432
Returned										54
Distributed	3	1	4	3	3	9	7	6	25	96
On hand Aug. 1, 1915	7	12	82	4	150	136	176	245	38	390

It would seem that the number of copies returned unclaimed is entirely too large, and in order to remedy this each member

should see that his address, as placed in the hands of the secretary, is correct.

The number of books sold is forty which is in excess of any past sales. There have been a few requests for the exchange of the proceedings for other books and periodicals, but as yet these requests have not been granted.

Respectfully submitted,

J. N. FROST, Librarian.

(Report presented by secretary as the librarian was unable to attend the meeting.)

REPORT OF COMMITTEE ON RESOLUTIONS.

Whereas, Through the foresight and generosity of John D. Rockefeller by means of the Rockefeller Foundation, an institute for research in disease in animals has been established, and its maintenance provided for in our country which is certain to be of immense value in the conservation of the live-stock interests not only of the United States but of the entire world; therefore

Be it Resolved, That the A. V. M. A. recognizes its value and appreciates the generous act of Mr. Rockefeller.

(Resolution was unanimously adopted.)

Whereas, The live-stock interests of the country have recently been menaced by that serious animal plague, foot-and-mouth disease; and

Whereas, The methods adopted by the Bureau of Animal Industry, U. S. Department of Agriculture in the control and eradication of this disease, have succeeded in practically wiping out the infection; therefore

Be it Resolved, That this association express its hearty commendation of the methods employed by the Bureau of Animal Industry in its monumental task of circumscribing the area of infection as much as possible and thereby aiding in the protection of other sections of the country which, otherwise, must have shared in the general infection; and

Be it Further Resolved, That in the opinion of this association the gratifying results obtained could not have been secured in the time by other means than those employed, nor under other authority than the Federal Bureau of Animal Industry as at present constituted.

(Which resolution was adopted.)

Whereas, The 51st annual meeting (in 52d year) of the A. V. M. A. held in Oakland, California, has proved such an

unqualified success, due to the admirable location and other local features, but especially to the splendid efforts of the various local committees, and the hospitality of the good people generally; therefore

Be it Resolved, That the sincere thanks of this association be extended to all who in any way contributed to the success of the meeting; and

Be it Further Resolved, That special thanks are due the press of Oakland for the large amount of space devoted each day to the deliberations of the association; and

Be it Further Resolved, That an expression of appreciation and thanks is hereby tendered the management of the Hotel Oakland for its efforts toward the success of the meeting.

DRS. DALRYMPLE,
NELSON,
NORTON,
RUTHERFORD and
SHEPARD, Chairman *pro tem*.

REPORT OF THE COMMITTEE ON LEGISLATION AT THE A. V. M. A.
MEETING AT OAKLAND, CAL., 1915.

The past two years have been ones of anxious expectancy terminating in the keenest disappointment in that our Army Veterinary Service bill failed both in the 62d and 63d Congresses.

It is an unusual experience in the annals of Federal legislation that a bill originating in the House and passing that body would fail in the Senate. Of exceptional record is the fact that a bill passing the House twice by unanimous consent, that such a bill would fail in the Senate after having been favorably recommended by the Senate Military Sub-Committee, then approved by the Senate Military Committee as a whole, yet such has been our experience.

No calling of men, no profession ever put up a more public spirited fight for just recognition than was made under the direction of your Committee through the membership of the association, and no effort ever achieved richer results, for it brought a direct action or implied support of every member of the House, exceeding more than three hundred and seventy-five members in number.

I shall not attempt to go into the many details of this campaign, but to briefly record that your Committee sent forth during the 63d Congress, 8,800 reprints, 3,200 circulars, 7,854 bulletin letters, 800 briefs of our claims and five hundred copies of

our bills. These various appeals going forth not in bulk but to individual members of the profession at the various stages of the progress of this legislation.

At first thought one might be tempted to conclude that this was lost service, but as Chairman of your Committee I would count much of this work as gain in the great educational campaign your Committee has carried on. We did not consider in our efforts that we were to win by the fiat of any one man, any group of men nor by any methods that would cast one single reflection upon the profession, nor did we ever ask any member or friend to use his influence or make an appeal in any way than that our country owed this recognition to the profession and that we had suffered an injustice which we asked to be righted, and I am fully assured that the members of the 62d and 63d Congresses felt fully convinced of the same. Your Committee feel deeply indebted to the loyal work done in every state of our fair land and rejoice that to-day there will be no greater service to be done in the House than to canvass carefully the new members elect, who were not in either the 62d or 63d Congresses.

Respectfully submitted,

W. HORACE HOSKINS, Chairman.

REPORT OF THE SALMON MEMORIAL COMMITTEE.

By DR. W. HORACE HOSKINS, Acting Secretary, Annual Meeting of the A. V. M. A., Oakland, Cal., September, 1915.

Dr. Daniel Elmer Salmon was born at Mount Olive, Morris County, New Jersey, July 23rd, 1850 and died at Butte, Montana, August 30th, 1914, a little past 64 years of age. Passing the early part of his life on a farm he entered the public school, later the Chester Institute, Eastman Business College and completed his education at Cornell University.

He was one of the first students at Cornell at its opening in 1868 from which institution he received his veterinary degree of B.V.S. and a pupil of that venerable Professor of Veterinary Science "James Law." Some six months of his veterinary course was spent at the "Alfort Veterinary School" in France.

In 1876 he received from Cornell the degree "Doctor of Veterinary Medicine."

His earliest work in the uplift of the profession was a course of lectures on Veterinary science at the University of Georgia in 1877.

He was a pioneer worker for the Federal Government in

1878 in the study of the diseases of swine. In 1879 on the Contagious Pleuro-Pneumonia of Cattle staff where he was associated with his preceptor Prof. Law. Later under United States Commissioner of Agriculture LeDuc he took up the study of Texas Cattle fever.

In 1883 under U. S. Commissioner of Agriculture Loring he established a Veterinary Division in the Department of Agriculture which in 1884 became the Bureau of Animal Industry of which he became Chief, and held this post with the greatest honors and distinction until Dec. 1st, 1905.

After his retirement from the Federal service he accepted for a period of five years under the Government of Uruguay the duties of establishing a Veterinary Department at the University of Montevideo to build up animal industry in that country.

Dr. Salmon was an honorary Associate of the Royal College of Veterinary Surgeons of Great Britain; Fellow of the American Association for the Advancement of Science; chairman of the Committee on Animal Diseases and Animal Food of the American Health Association; ex-president and member of the executive committee of the American Veterinary Medical Association; member of the Washington Academy of Sciences and of various other bodies devoted to medical and general science. His writings of these subjects are well known and have been published in many languages.

I count it one of the special privileges of my life to have had more than twenty-five years of my professional career linked closely with a like period of Dr. Salmon's. His ever forward movement in the great uplift of the profession in official life and his great appreciation of every broader college movement, in that it fitted men for higher duties that waited for men to perform were charming aspects that I love to recall.

I rejoice that my years of service in our profession gave me the opportunity of knowing much of his point of view in many of the earnest controversies that illuminated our journals and gave a national aspect to our U. S. V. M. A. meetings in the days of Contagious Pleuro-Pneumonia and the early period of investigation of the Swine Plague and Hog Cholera. I can recall the expressions of doubt and the almost ludicrous doubting amazement when the Texas Cattle Tick was decided as the great propagating factor of Texas Cattle Fever. I can vividly recall the earnestness of his face before convention gatherings when presenting his views on these subjects. I can see before me the triumphant smile that made his face beam with gladness and

sent conscious feelings of real joy of the great service that was to flow to our Country from these achievements.

How humbly modest, but filled with feelings of greater responsibility, characterized his reaching the Presidency of this Association in the memorable contest at Nashville that gave him this coveted honor. I was not his advocate or supporter at Nashville for I fathered in some part the candidacy of the late Dr. Fred Osgood, but when the battle was over and I had assured the then President Salmon of my readiness to in every way support his administration, the cordial greeting that followed made the bonds of friendship stronger than year by year added a greater measure of pleasure and joy as the pilgrimages to these meetings increased in number. Some may be present here today who will recall the episode of our meeting in Omaha in 1898. We were traveling to that City in goodly numbers in the same train and the early announcement that breakfast would be served in the dining cars to be attached at Columbus, Ohio, whetted our appetites. Stealing a march on our more somnolent associates, Mr. Hoskins, a lady traveling from Pennsylvania to her home in Chicago, Dr. Salmon and myself left our sleeping car and passed along in the train shed to the dining car, where for more than an hour we enjoyed a splendid breakfast and with many feelings of exultation of how we had stole a march on our confreres. When breakfast was over we in the height of good humor started forward through the train for our sleeper. When we reached the baggage car without finding our sleeper, it dawned upon us that something was wrong and in a few minutes we learned that we were on the section bound for St. Louis and one hour and one-half out of Columbus. The conductor proved to be a brother Mason and trains were held for connections and we were sent via Indianapolis to Chicago on a special train dead-heading to Chicago from the G. A. R. Convention at Cincinnati, Ohio. We arrived some three hours later than our right section and the boys were waiting to greet us with the laugh on their side. Dr. Salmon could never recall this incident but it brought forth a jolly laugh and though he was not a Mason he ever appreciated the solicitous care given our party as we were 'entrusted' to members of the craft at the various points from Columbus via Indianapolis and Chicago.

Few men were gifted to fill official place with such splendid personal equipment as Dr. Salmon and no public service, federal or state, ever received more fully the best of a good man's life than our Country received at his hands. A broad education en-

dowed him with the highest ideals. The greatest good to the greatest number ever tempered the scientific truths he sought, that they might bring the greatest blessing to mankind and at the same time strengthen in justice the economic service of Animal Industry.

He was a splendid judge of men and ever dealt with them in the spirit of kindness and forbearance. He built a public Veterinary Sanitary Control service better than he knew. He enlarged a country's animal food products field of consumption ten thousand fold, from a bureau at its creation limited to not exceed twenty in number he lived to see it employ more than a thousand Veterinarians and our country travel into Europe in a single year on the back of \$400,000,000 of pork alone. From a service to eradicate Contagious Pleuro-Pneumonia and find the cause of Texas Cattle Fever and some method for its control, he saw the work of this department expand into a score of subdivisions and every aspect of animal industry enhanced and enlarged and a nation's animal food supply better guarded than any other nation in a like period of time. He enriched a nation in greater real wealth than any other department of our Federal Government.

He enriched our profession by the most liberal giving to us all the fruits of the work he lovingly and devotedly fostered and laid us under the richest and truest obligations man can create in the debt of knowledge we owe him and the service he gave the richest years of his splendid career.

The hand of official power under our politically governed country may be the greatest boon to mankind or it may be the destroyer of the highest and best ambitions of men. The power of a President was never used more unjustly and more arbitrarily in our Nation's history than the demand of the then President Roosevelt for his resignation from office, when a committee of his peers had sat in judgment on the charges against Dr. Salmon, and fully and freely exonerated him from the same. "Uneasy lies the head that wears a crown," is oft repeated in a nation's growth and development and the power that drove from office this good man at the zenith of his best work and greatest achievements is the most unfortunate part of our political system of government. The sting of ingratitude is the hardest wound to bear and the slowest to heal and I am full sure shortened the splendid public servant's years.

For five years he gave to Uruguay the value of his long years of experience in the establishment of a Veterinary School and the

development of her animal industries co-ordinate with higher Veterinary education. When this period of exile was complete he returned to the land that he loved, but found no place where his services were specially demanded and accepted a place at Butte, Montana, in a commercial Hog Cholera serum producing plant. The climatic change proved too trying and an acute lung affection in a few days removed from our midst this valuable man.

Let us with all the richest blessings that have flowed from his well lived life; with all the tenderness engendered by an intimate acquaintance with this good man's career; with all the devotion to one who gave a life time of service that we might be bettered in a hundred ways, rear a fitting monument that shall fitly express our appreciation of his splendid work and that shall live with future generations that shall continue your and my work, a living testimonial of our esteem and appreciation and that shall in the fullness of time, enrich and enlarge the field of work, he so patiently sowed and cultivated.

REPORT OF THE COMMITTEE ON INTELLIGENCE AND EDUCATION.

BY C. H. STANGE, CHAIRMAN.

At various times in the past your Committee on Intelligence and Education has reported concerning the work that was being done in the several veterinary colleges of the United States and Canada. Inasmuch, however, as the Association now has a special Committee on Veterinary College Investigation the Committee on Intelligence and Education has attempted to prevent any encroachment on that field. Our report is presented in three papers in addition to the one presented by the chairman, viz.:

The requirements for a Veterinarian, P. A. Fish; Discussion of Present Methods of Teaching, J. F. De Vine; The Practical part of Veterinary Education, A. H. Baker.

Each author is responsible for his own statements only.

It would be possible to enumerate many things which would indicate growth and development of the veterinary profession and reflect credit on its many members. I assume, however, that the association is more especially interested in knowing what this Committee has to suggest in regard to the future.

It is folly to deny that the veterinary profession of the coming years will be *what the institutions of this country make it*. That the attitude of the profession in general has a marked influence on what can be and is accomplished by the several colleges must also be admitted. The problem of education, which is a

fundamental one, becomes therefore one in which the entire profession is concerned. Why then should we not face the issues squarely and avoid deceiving ourselves or being misled by those whose interest in the work cannot be questioned, but whose commercial tendencies have been permitted to flavor the very nature of their progress. We need men who are willing to practice a profession and not men looking for a commercial or business career. I venture to say that before our profession can reach the position of importance, trust and dignity, that it should occupy and which we all covet for it, it must mean more than an attractive opening to those who are casting about for opportunities to secure comparatively large monetary gains.

In order to reach this much desired goal the profession must be given a spirit and a character which mean individuality and insure honor and respect for those who are a part of it. Possibly this may be more clearly expressed by saying that the profession must not be for individuals but that individuals must be developed for the profession. It must be higher and more important than the persons who may chance to enter into it. The profession must have a value within itself and not act simply as a means of bringing happiness and comfort to individual persons who form a part of it. There must be an ideal to serve as nothing else can induce men to spend their life in the service of any science. It is not a question of enjoying happiness, but of fulfilling duties. The profession should not be considered a business any more than our flag is looked upon simply as a piece of cloth. We must lend honor and distinction to it.

Dr. Leonard Pearson, as Chairman of this Committee at one time stated, "Science is international, it knows no political boundaries. * * * The veterinary Sciences are of the same age in this country as everywhere else upon the earth. It is only the public recognition of the value of the veterinary sciences that is young and immature." Since that statement (which contains a volume of truth and much food for thought) was written, considerable progress has been made, but rapid strides cannot be insured nor can success be attained unless we recognize the broad basis and vital factors which concern our work as specialized members of an organized society. Therefore let us not be unfair to ourselves and to the future of our profession by not admitting self evident truths.

An attempt to determine what the educational policies of this association are has resulted in the conclusion that it had no well defined policies. Permit me to summarize the efforts of the A. V. M. A. in educational matters.

In 1907 this association declared itself as being in favor of raising the standards of veterinary education in the United States and Canada by regularly adopting the following—"That this association co-operate with the faculties association to endeavor to raise the standards of veterinary education in the United States and Canada, and—, to encourage uniformity in entrance requirements, curricula, examinations, graduation requirements and degrees."

The object sought in regard to uniformity in degrees has been realized. No further definite activity on the part of this organization concerning educational matters however was recorded until 1910 when proposed amendments to Article VIII pertaining to applications for membership were tabled for one year. In 1911 it was decided that an accredited veterinary college must conform to the following requirements concerning entrance requirements and course.

(a) Matriculation equivalent to requirements for admission to a recognized high school. Matriculation to a recognized veterinary college shall be one year of high school work or the equivalent beginning with the term 1914-15 and that the requirements be raised to two years of high school work, parts of different calendar years, or its equivalent, beginning with the session 1918-19.

(b) A curriculum of not less than three collegiate years, of not less than six months, each, especially devoted to the study of veterinary science. Beginning with the session of 1913-14 the curriculum shall cover a period of not less than twenty-four months of not less than three collegiate years, devoted to special study of veterinary science.

In 1912 the requirements in the by-laws were changed to read, "Three Collegiate years, of not less than seven months each. The requirement of not less than 24 months was postponed for one year or beginning with the 1914-15 session."

In 1913 our by-laws were again modified, putting into force Regulations one to nineteen B. A. I. circular No. 150. Some progress is apparently being made by the substitution of a first grade Civil Service examination as a matriculation examination instead of a second grade as heretofore required. The subjects required are of the most elementary character and unfortunately the conduct of examinations except in case of most state institutions is entirely in the hands of those in charge of the collection of tuition fees. *Are these regulations going to be transferred from paper into actual practice?*

It is difficult to understand how a class consisting of two or three hundred students whose preliminary education varies from partially completed public school work to completion of high school (possibly in a few cases some more advanced work), can be converted as a class into competent veterinarians in 18 to 24 months. The limited number composing the faculty in our schools precludes the possibility of giving personal attention to the varying tendencies and capacities of such a large number. The addition of another year to the course will not serve to correct this difficulty, although it may alleviate it to a slight extent.

A tendency, whether it is increasing I will not attempt to discuss, but nevertheless is serious, is quite noticeable and should be carefully guarded against during the college days. This tendency is toward a lack of wholesome interest in and sympathy for the live stock industry of our country. *In some cases this amounts to little less than a regard of the stockman as a legitimate prey for the veterinarian.* This is especially noticeable where the student is educated in an atmosphere of commercialism instead of an educational and professional one.

No attempt has been made to make other than general statements as specific information will probably be supplied by your special committee. This educational question, however, has reached the stage which requires free and frank discussion and most of us would prefer to have some other person do that. This committee could have discussed only the more pleasing subjects.

Is it not true that this association has been led into temporizing with the problem of most vital concern to a profession supposed to protect not less than seven billion dollars worth of live stock? Indeed some of the most recent criticisms by stockmen of the work done by veterinarians, we claim are ill advised and unjust, *but permit me to remind you that for several years young men being educated by the thousands as leaders along agricultural lines have had a preliminary education as thorough as the highest requirements of any of our veterinary colleges exact to-day, while the actual requirements for entrance to many of the veterinary schools at the present time would not admit a young man to even a two-year subcollegiate in agriculture.* I ask in all sincerity can we expect, under such conditions, to turn out men who will command the respect and confidence of the animal owners who, themselves, have had a more thorough education in the basic sciences upon which veterinary medicine rests? Indeed, the Legislature of a few states has enacted laws requiring that veterinarians practicing in these states should have a higher

preliminary education than the colleges in those states required. This was done to insure the livestock owner of the counsel and advice of men of at least their own educational attainments. I predict that many of the other states in the near future will take similar action.

All the members who have contributed to this Committee report in substance have urged a more thorough education for the veterinarian along one or several particular lines so that your Committee is unanimous on that most important point.

It is evident that a four year course of nine months each is none too long to provide for the necessary collegiate work. In fact, another year will practically insure this in most if not all State Institutions. With this must come better foundation work both preliminary and in the sciences and agriculture. Some institutions have already adopted six year combined courses and have had students enrolled from the beginning.

The A. V. M. A. cannot afford to do anything to embarrass any of our veterinary colleges or their proprietors unless it be for the benefit of the profession which should always be considered first; welfare of individuals next. However, this is a very small consideration when compared with the welfare of the Live Stock Industry and the future standing and efficiency of the profession. In view of these facts can this association do less than to adopt and put into force at the earliest possible date the requirements so skillfully swept aside (unconsciously, except to a few), at the 50th Anniversary Meeting.

In this report many important points have been omitted, but as the subject is not new most of the members have formulated some idea as to what should be done. With the association's permission, the writer would like to suggest that if the A. V. M. A. intends to assist in developing veterinary education it cannot afford to be without a well defined policy which should be planned well in the future. A semi-permanent committee should be provided for, this committee to formulate a policy concerning educational questions for consideration and adoption by this association. The policy, when once adopted, should be subject to change only after careful consideration by the proper committee followed by the approval of the association as a whole.

THE REQUIREMENTS OF A VETERINARIAN.

BY PIERRE A. FISH, ITHACA, N. Y.

The aim of all veterinarians should be to place the profession on as high a plane as possible as regards efficiency and the

respect of the community—that it may in fact, as well as theory, become a learned profession. While there may be various requirements to bring about this desired end, such as a good moral character, a pleasing personality, an adequate technical knowledge and perhaps various others, a fundamental requirement is a good general education—the possession of knowledge and the ability to use it.

In earlier days when live stock was both cheap and plentiful, the health of the individual animals was a secondary factor, for they could easily be replaced at low cost. Under such conditions it was economical to leave the treatment of the sick in the hands of unskilled and often illiterate employees. After a more or less extended experience with sick animals these men felt competent to set themselves up as “doctors” and acquired more or less practice. It was not to be expected that men of this character, many of whom spent their spare time in saloons, should have a very high standing or hold very much respect in a community.

In the course of time, as the value of the animals increased and there was some demand for veterinarians, schools, with meager entrance requirements, were formed by private individuals who, incidentally with their practice, served as instructors. Although these schools were undoubtedly originated, in part, for financial gain, they also marked an advance over previous conditions. Instruction in veterinary subjects has been and still is, given in many agricultural colleges more with the view of enabling their students, when they become farmers, to treat the patients rather than to develop the professional side of the subject.

At the present time with an increasing scarcity of animals and their higher financial and economic value, a few of the states, realizing the importance of the live stock industry, have established State Veterinary Colleges for the purpose of promoting research relating to the domestic animals and training young men as veterinarians to devote, as far as possible, the same skill and application to their animal patients as physicians apply to human subjects. This involves a considerable financial outlay, and as in the case of higher educational institutions generally the expense of educating a student is greater than the financial income derived from him. The state school is not, therefore, a money-making concern. Its purpose is not profit but public benefit. The state, in recognition of its bounty, usually requires of its recipients a standard of education equivalent to that of a high school course, and this requirement ought not to be considered too severe as a

foundation upon which the superstructure of a professional and technical education is to be reared. The effect is that the student has a fair education when he comes to the veterinary college and the end product marks an advance for both the profession and the public.

This brief sketch of the evolution of the veterinary profession is not unlike that of other professions except that the veterinary is still in the transition stages while the other professions have advanced farther. In the present generation all of the stages outlined above may be found.

In addition to the foresight of certain states and a somewhat awakened interest of the public, there are two other factors which should be considered in connection with this evolution. The first is the American Veterinary Medical Association which as an organization, requiring a certain standard for admission to membership, can and has raised the profession to higher levels. The mere fact of organization, whether general or limited in scope, marks an advance because it represents community of interest. It is largely through the efforts of this association that all of the schools of this country are now on a basis of a three year graded course. It would seem, however, that in one important respect the association has failed to advance although efforts have been made by certain of its members from time to time. After fifty years of existence it still permits a most elementary educational requirement as a foundation for veterinary instruction. It is apparently still satisfied with the requirement of a grammar school education, or the knowledge ordinarily possessed by a child of thirteen or fourteen years of age. The result of such a policy is not only to increase the output of veterinarians, such as they are, but to encourage many young men inadequately prepared to take, what they believe to be a short cut, with a minimum of time and expense, to break into a learned profession. Under such conditions the public cannot be blamed for withholding its recognition of the veterinary as a learned profession. The public is more or less aware of what is required for entrance into other professions and cannot be expected to sympathize with any attempt to circumvent such requirements. Even yet the veterinary profession is more or less handicapped by the illiteracy of some of its earlier representatives.

Statistics recently printed state that the total annual output of veterinarians from Denmark, Germany, France, Sweden and the British Isles is from 526 to 586, while that from the United States is 750. If these figures are correct this country alone

turns out about fifty per cent more veterinarians than does the major countries of Europe. In proportion to population this country exceeds them all. As compared with Germany the proportion of the output to population is nearly twice as great. It is a little more than twice as much as either France or Sweden and is a little more than four times as great as that of the British Isles. While we have the somewhat doubtful distinction of standing first as regards output, we have the misfortune, except in isolated cases, of standing lower than any of the European schools as regards entrance requirements and length of course. Even on our own Continent, the schools in certain of the South American countries and the Philippines exceed us in this respect. Now that we have a sufficient quantity of veterinarians, or more than enough as compared with European countries, is it not time that more attention should be paid to the quality of our output? If we ever hope to become a world power in veterinary affairs we should have quality rather than quantity to compare with other nations.

At the Toronto meeting in 1911 an attempt was made to take a short step in advance by the adoption of two resolutions. One was that "beginning with the session of 1913-14 the curriculum shall cover a period of not less than twenty-four months of not less than three collegiate years, devoted to special study of Veterinary Science." This was to replace the regulation in circular 150 of the U. S. Department of Agriculture which required a course of nineteen and a half months exclusive of final examinations and holidays. The other resolution was to the effect that beginning in 1914-15 one year of high school work or its equivalent should be required for matriculation in the veterinary schools and in 1918, two years of high school work should be required for this purpose. At the meeting in Indianapolis in 1912 objection was raised to extending the course to twenty-four months at the date mentioned and a delay of two years was asked for. The decision of the association was a compromise and a postponement of one year was granted, making the resolution effective in 1914. In March, 1914, one of the leading veterinary journals of this country, commenting upon the published proceedings of the 1913 meeting at New York City, stated that an examination of the proceedings revealed no errors in the account of the meeting as published in a previous issue of the journal "but a number of additions may well be made to the report as there given." It is stated that the course of instruction as prescribed for colleges, which would remain on the accredited list of the Associa-

tion, is not twenty-four months as was generally believed it would be beginning with the year 1914-15, but a course "conforming to the requirements of regulations one to nineteen, inclusive, of the Bureau of Animal Industry circular, No. 150." The writer was unable to find any specific change of this character mentioned in the printed proceedings, but after correspondence with the President and Secretary of the New York meeting, it appears that a resolution was passed adopting the recommendations of the Committee on College Investigation as mentioned on page 175 of the Proceedings for 1912. A reference to this recommendation shows that it suggests the adoption and substitution of the Bureau regulations, one to nineteen inclusive, for the first sentence of paragraph A. and paragraphs B. and C. of section 2, and for section 3 of article VIII of our By-Laws. That a resolution so vital to the welfare of the association should pass unanimously when it is known that many members are opposed to such a change would indicate that the purpose of the resolution was not understood.

The statement of the journal was essentially correct and the slight step in advance decided upon at Toronto is not to be fully taken and the resolution to lengthen the curriculum to twenty-four months and other important matters are rendered negatory by the adoption of the Bureau regulations. The journal, however, states that the matriculation requirements for recognized veterinary Colleges will be one year of high school work beginning 1914-15 and two years in 1918-19 and thus believes some progress is made. The way in which the year of high school requirement is to be met is shown by the catalogs from certain schools which announce that they will receive matriculants having a diploma from a recognized college, normal school, or high school without examination. Not having either, the applicant may be admitted: (a) by passing an examination in spelling, arithmetic, letter writing, penmanship, copying from plain copy, United States history, geography of the United States and its possessions (the second grade Civil Service Examination) and (b) by presenting a certificate showing the completion of at least one year of high school work, or by passing an examination showing an equivalent training. The examination showing an equivalent training may be in high school studies, or in *subjects pertaining to the occupation, business, or calling in which the applicant has had experience.* (Italics our own.)

The catalogs state further that: In recognition of the fact that age, maturity, experience and other factors tend to com-

pensate, in a measure at least, for scholastic attainments, applicants over 21 years of age may, on presentation of satisfactory reasons, be admitted by the Board of Directors, or the Executive Committee of the College *without passing the equivalent examination*; (b) provided, that if any student has been so admitted, he shall take the omitted portion of the entrance examination at least one academic year before he may become a candidate for the degree conferred by the College, or, in lieu thereof the Board of Directors or Executive Committee, *may substitute excess work in other approved subjects.* (Italics our own.)

Stripped of its verbiage the preceding statements mean that an applicant must know how to read, write, spell and have some knowledge of arithmetic, history and geography limited to the United States and its possessions, and in lieu of one year of high school work, if he is 21, he may take a little extra work in an overcrowded curriculum.

The interpretation of the equivalent of one year's high school work is novel. The substitution for it of an examination on subjects pertaining to the occupation, business, or calling in which the applicant has had experience means that the farmer may be examined in hoeing corn, gathering crops, pruning orchards, care of stock, etc.; that the chauffeur may be examined as to the mechanism of an automobile—if he has a license that may, perhaps, be accepted in place of the examination; that the booze dispenser may be examined on how to mix drinks; that the grocer's assistant may be examined on how to deliver groceries, and that musicians, trainmen and so on *ad infinitum* may be examined in their respective occupations. If examinations in subjects pertaining to the occupations in which the applicant has had experience is desirable for entrance into the veterinary as a *learned* profession in lieu of an education, then the attention of our sister professions should be called to that fact. We respect the dignity of labor but submit that a trade is not a substitute for a complete or partial high school education and that many occupations are entirely foreign to an adequate preparation for veterinary work. A further consideration is the enormous amount of versatility required of a faculty capable of conducting real examinations pertaining to the various occupations, pursuits, etc., of the applicants.

It is a sad commentary on the fiftieth anniversary of this association that a retrogressive educational step should have been attempted and accomplished. It is retroactive, and this tendency by the association as the representative of the profession would

seem to justify the opposition of the army in its antagonism to a recognition of the Veterinary corps.

The second factor in the evolution of the Veterinary profession in this country is the U. S. Department of Agriculture. A few years ago this department appointed and sent out a committee to investigate the methods of instruction in the various veterinary Colleges and to make recommendations. The recommendations with perhaps some minor changes were later converted into regulations and with the approval of the U. S. Civil Service Commission published as a circular of the Department. The circular states that it must be distinctly understood that no power to direct or control the work of the veterinary colleges is claimed either by the department or Civil Service Commission but that the regulations are merely to indicate the requirements of the Government as to veterinary colleges whose graduates are admitted to examinations for veterinary inspectors in the Bureau of Animal Industry. The department also publishes a list of the accredited colleges.

Some, while admitting the right of the department to determine the grade of its employees, maintain that its action has been in effect to wield the "big stick" and dictate the curriculum and certain details of management and that its published list conveys a wrong impression by intimating that all of the schools are of the same educational standard. Whatever the merits of the controversy, there is no doubt that the action of the department has increased the efficiency of veterinary instruction and due credit should be given to it as a factor in the evolution that has thus far been attained.

It, nevertheless, stands as a reproach to this association and to certain schools that this progressive step was compelled to be taken by a force outside of the profession. It will be a still greater reproach if the power of the Department of Agriculture should find it necessary for the best interests of the live stock industry to raise the entrance requirements and lengthen the course of instruction.

While acknowledgment should be freely rendered for what one department of the Government has done, condemnation should be just as freely expressed for what another of its departments is doing to counteract the good intentions of the other. This condemnation refers to the postal department, which permits the misuse of its mails by veterinary Correspondence Schools. Whatever legal technicality may intervene, the moral evidence is clear that much damage is done to live stock, the

number of illegal practitioners increased and that these schools, by their misleading assurance to prospective students, obtain money under false pretenses and share a portion of their ill-gotten gains with the Government by their liberal use of the mails.

Can "age, maturity, experience and other factors tend to compensate, in a measure at least, for scholastic attainments"? If they will compensate for a high school education, cannot they just as logically compensate for a grammar school education? Will anyone say they also compensate for the alphabet? If we could conceive that higher entrance requirements would increase the number of students and would bring higher financial returns to the schools, would there be any opposition to such requirements? This country already has the distinction of the greatest output of veterinarians as compared with other important countries but statistics show that the number of the domesticated animals is not increasing. Veterinary education in this country should be second to none but it will never attain that rank so long as a money making basis is its underlying foundation.

The report of the U. S. Census shows that the average income of the educated is higher than that of the uneducated man and in its classification shows that those who have had a high school education represent a capitalization $33 \frac{1}{3}$ per cent. higher than those with only a common school education. It is reasonable to assume that, other things being equal, the percentage will not vary materially after a veterinary education has been added.

It is difficult to see, after fifty years of organization, how the moderate resolutions passed at Toronto should work-hardship to any school which really has the best interest of the profession at heart. In the efficiency of the men entering, it was not asked that an advance of $33 \frac{1}{3}$ per cent. be made all at once but at the outset only about an 8 per cent. increase and after four years an increase of another 8 per cent., and that a curriculum of $19\frac{1}{2}$ or 21 months should be increased to 24 months. Is there to be a veterinary profession or a veterinary trade in this country? Are we in it just for the money that can be made or because of a higher feeling that we can be of some use to the public and to the dumb animals whose health is entrusted to our care? Does this generation of veterinarians insist that its sons and successors must not have better advantages than we have had? At the present rate of progress, what can we hope for in another fifty years?

A profession has been defined as an occupation that involves a liberal education. It implies scholarship. There is a dual pur-

pose in a professional education, one which relates to position in the public and the other to the technicalities of the special branch involved. If we are ever to hold up our head with the other nations of the earth in veterinary affairs, we must recognize the fact that organization must concern itself not merely with community of interest but with the interest of the community as well.

DISCUSSION OF PRESENT METHODS OF TEACHING.

BY J. F. DEVINE, GOSHEN, N. Y.

My report as one of the Committee on Intelligence and Education will be confined to criticism of the present methods of teaching in our veterinary schools with particular reference to the teaching, or lack of teaching, of the graduates who intend and do take up the general practice of veterinary medicine and are usually termed "veterinary practitioners."

As to the methods of teaching those who specialize in any of the various so-called scientific branches of veterinary medicine, such as bacteriology, meat inspection, etc., I have no comments to make, and in order that my listeners may not construe my attitude as prejudiced toward colleges, I might add that I am not only a practicing veterinarian, but have been interested in teaching two subjects in my Alma Mater for several years.

Veterinary education is in an era of ascendancy. We see signs of progress on every side. Higher standards of elementary education as entrance requirements to veterinary schools are being exacted by all recognized colleges. Much of this is due to association work and particularly to this grand organization (The American Veterinary Medical Association), and it is my conviction that a college or school which does not exact a reasonable preliminary education as an entrance requirement, and give a thorough course in all branches of veterinary science as known to-day, and the State that does not protect the graduates of such schools, is guilty of a crime against society. You will note that I say a *reasonable* preliminary education. I am not a believer of extreme requirements, since such measures would be likely to discourage men of a desirable type from entering our profession. While it is absolutely essential to have a reasonably safe frame-work on which to build, it is likewise possible to overdo the preliminary educational question for practical purposes, a tendency I fear too easily acquired by those living in a university atmosphere. It might be well to remind

those who think it so necessary to delve so deep, that with rare exceptions those who made universities possible lacked the polish of long contact with the emery of great colleges.

However, the preliminary education is not what I wish to discuss. It is the finished product that is put to the acid test. In my mind one of the principal causes of the advancement of our profession stands out as plain as a beacon light. It is that we are giving our state and our country better men, and one of the things that has made this possible is unquestionably the standard of our college courses which has made the work more inviting for men having a more liberal education and higher ideals. But this has brought us face to face with a problem that if our veterinary schools are to do the greatest good must be considered, to wit: That most of the young men entering veterinary colleges to-day have not had to withstand the trials and vicissitudes in order that they might become professional men, that some of us older ones experienced. Consequently, some of our schools are turning out men who some stockmen and horsemen are wont to sarcastically term "kid glove veterinarians"—men who consider it too menial to soil their hands or clothes; while other more charitable critics say the colleges are graduating men with a willingness to serve their clients, but with a lack of knowledge to do any one practical thing. Veterinarians of this type, I care not how well their training may be, are a disappointment to themselves and an actual injury to the live stock industry. They occupy good men's places and are a detriment to the advancement of our profession. True it is that some of these young men are willing and if they had had some practical experience coupled with their scientific training, their success would in many cases be instantaneous.

I appreciate the fact that the untrained, illiterate quack has been rapidly giving way to the well-educated, refined young man, but the deplorable fact also confronts us that with the older type of men we have lost a large percentage of the real practical horsemen and stockmen. I often stop and wonder why this is so. Is it an impossible composite to be a practical man and still be learned and cultured? I think not. But in our efforts to get away from the old type practitioner, we have jumped too far and in most cases it is not solely the fault of the student, but the fault of our college. Some of our colleges that are looked upon as the greatest schools, have men teaching subjects to the young man who intends to go into veterinary practice, who are about as well qualified to teach such subjects as the non-graduate

would be to teach bacteriology or chemistry. It is true that theorists and those who pore over books and are called scholarly have a place in institutions of learning, but their course should be supplemented in every case by a teacher who has been or is a practitioner of experience.

I recall complaining to one of the officials in one of our State schools that some of his new graduates who had been around my office from time to time were not as capable in a practical way as a stable boy. His reply was that practitioners expect too much of the new graduate, and he compared them with the young medical man who spends from one to several years as an interne in a medical hospital before entering general practice. A very good argument you will say—but in contrast to this, it seems to me, that new graduates expect too much of the practitioner, as I have rarely seen one of these young men seeking a position as an assistant who would not quickly make it known to you that he considered his services worth at least a thousand dollars a year. If there is any locality where veterinary practitioners can afford to pay one thousand dollars a year for the society of a young graduate to ride with him and expect no practical service many of us would like to know of such a locality.

No veterinary college can hope to mould every man into an ideal veterinary practitioner any more than they could make each student a high class bacteriologist, pathologist or chemist, but surely there can be injected *somehow* in the course *something* that will assist in shaping the destiny of at least a majority of our young men who show special interest in practical work. I regret that I have no definite plans to submit to this Society or to the schools for correcting the shortcomings I speak of, but I have an idea in mind which I shall simply suggest for your consideration, and that is the desirability of exacting that a student of veterinary medicine give a certain time, *of not less than three months*, to practical work embracing the general care of the larger domestic animals on a stock farm or where similar experiences are obtainable, and that evidence of this experience be exacted as one of the conditions precedent to receiving the degree of veterinary medicine.

THE PRACTICAL PART OF VETERINARY EDUCATION.

BY A. H. BAKER, CHICAGO, ILL.

Hospital practice is as important in the curricula of veterinary colleges as the didactic courses. It holds the same relation

to the course in theory and practice of medicine and surgery as the laboratory does to the courses in bacteriology and pathology, and the dissecting room to anatomy.

No one would think of curtailing dissecting or laboratory work in connection with the last three mentioned subjects. Their value is self-evident to every teacher of them. To slight them would reduce the character of the teaching to that of correspondence schools, which we all recognize as utterly impractical.

The Department of Agriculture prescribes 300 hours for diagnostic methods and clinics in the department of theory and practice of medicine, and 310 hours in surgery, including surgical exercises and restraint.

These numbers of hours are none too many, for they give the students opportunities to see and handle patients, which impresses the matter upon them to a far greater extent than the same instruction given in the lecture room. They are practical demonstrations of the science as taught in the lectures. They give the teachers opportunities to repeat much of the scientific matter given in their lectures and to demonstrate the application of their theories in actual practice. For this purpose it is necessary for a veterinary college to have a hospital in connection, to teach the students how to make diagnoses and to enable them to observe, from day to day, the results of treatment. It is also necessary to have an out clinic to furnish a larger variety of cases, including lameness, which requires oft-repeated close observation to differentiate between the symptoms of the various troubles. It requires a lot of practice to enable a student to differentiate between the character of swellings and the various kinds of pulse. "Seeing is believing, and feeling is the naked truth." People can take in more with their eyes than they can with their ears.

The A. V. M. A. has passed a resolution requiring all veterinary colleges to give a course of 24 months. To give a course of 24 months I prefer four winter sessions of six months each, rather than three sessions of eight months, for the reason that the most interesting and profitable practice in the country is in April, May and June. In a six months' session the students can be let out about April first, thus giving them the opportunity to see active practice when it is the greatest and most instructive. In a session of eight months the students are at school in hot weather at both ends, and when they are released the major portion of the spring practice has passed.

Again, most veterinary students are men of moderate means and need to earn money during vacation to pay the expenses of the following winter. The six months' session will enable them to do so, when in an eight months' session they would not be able to do so on account of the shortness of the vacation. Again in an eight months' course students and faculty get tired of their job when the weather gets warm in the spring and prefer to be outside. The last month or six weeks is comparatively wasted.

To qualify students for veterinary work in any or all of its branches, the argument is strongly in favor of a four-year course of four sessions of six or six and one-half months each.

PRELIMINARY REPORT ON THE INTRAPALPEBRAL TUBERCULIN TEST.

By JOHN R. MOHLER AND ADOLPH EICHHORN, WASHINGTON, D. C.

In recent years many attempts have been made to devise a method of testing animals for tuberculosis which would be less laborious and time consuming than the subcutaneous test. The value of the subcutaneous test when applied by competent and experienced men cannot be doubted and for this reason it has been difficult to perfect a new test by which the presence of tuberculosis could be more accurately determined. Nevertheless, owing to the tediousness of applying this test and the possibility of the so-called "doping" of the tested animals, it would be of great advantage if another simpler means of diagnosis could be found which, in its efficiency, could be favorably compared with the subcutaneous test.

Many investigators have attempted to diagnose tuberculosis by various different tests based on the anaphylactic reaction of the infected individual. Among these the cutaneous, ophthalmic and intradermal tests have received special consideration. Various biological tests have also been experimented with, such as the complement-fixation, precipitation and agglutination tests.

Of all these latter tests, the ophthalmic and intradermal tests appear to be the most practicable. Somewhat encouraging results have been reported from the ophthalmic test, and at the present time it is recommended by certain investigators. However, a careful study of this test by the Bureau of Animal Industry has shown it to be less accurate than the subcutaneous test. The intradermal test employed on the subcaudal fold at the base of the tail has proved more promising and is receiving considerable support from many veterinarians. In an effort to

locate the most suitable place for the intradermal injection of mallein in the detection of glanders, Lanfranchi of Italy selected the lower eyelids as a new site for the injection and termed the resulting reaction the intrapalpebral test. Lanfranchi claims that by this method the good effects of both the ophthalmic and intradermal tests are apparent. Moussu as well as Drouin of France subsequently applied Lanfranchi's intrapalpebral method for the application of tuberculin in the detection of tuberculosis and more recently Norgaard of Hawaii experimented with this method of injecting tuberculin with gratifying results. The intrapalpebral injection is merely the application of the intradermal method to the lower eyelid. This location has been selected on account of the sensitiveness of the tissues and the looseness of the skin and underlying tissues of the eyelid which favor a marked development of the changes associated with this form of reaction. An edema in this location develops in a striking manner, making the reaction very apparent, even at a distance and upon a casual examination.

In order to test the efficiency of this method of diagnosis, Bureau tuberculin has been prepared by concentrating the ordinary subcutaneous tuberculin to 50 per cent of the original volume. With this tuberculin a number of animals known to be affected with tuberculosis and others known by previous subcutaneous tests to be free of the disease were injected into the skin of the lower eyelid. Careful observations were made from the time of the injection of all these animals. In from twelve to twenty-four hours from the time of injection in the animals affected with tuberculosis the development of an edema in the lower eyelid was observed which continually increased in intensity until in about forty-eight hours it reached its height, but persisted for 72 hours or even longer. The character of the swelling was not uniform in all animals, as is indicated by an examination of the photographs attached (Figs. 1, 2 and 3). In some instances it extended almost in a circular form around the entire orbital cavity. In other cases it only affected the eye in a semicircular manner, appearing as a puffy swelling, which was perceptible from a considerable distance. In severe reactions the conjunctiva becomes injected, with an increased flow of tears, and not infrequently a muco-purulent discharge, phenomena which are similar to those in the ophthalmic reactions. For diagnostic purposes, however, the latter phenomena are not essential, as the edema which persists for 48 hours after the injection is a sufficient indication upon which to base a posi-

tive diagnosis of tuberculosis. In making the observations any one may readily observe the reaction from a distance of from twenty-five to fifty feet in the tuberculous animals, whereas in the healthy animals there is no reaction whatsoever, both eyes having the same normal appearance.

In some instances the reaction was also accompanied by a more or less pronounced systemic disturbance indicated by an elevation of the temperature, which varied from 2 to 4 degrees above the pre-injecting temperature. The elevation in temperature appeared before the local reaction had fully developed and usually had entirely subsided at a time when the reaction appeared at its height. Comparative tests conducted with various tuberculin preparations such as glycerine-free tuberculin, extract of pure cultures, etc., proved that the best results may be obtained from ordinary Bureau tuberculin concentrated to one-half its volume, the glycerine content producing no perceptible edema in our healthy control animals.

The administration of the tuberculin causes no difficulty, and the small quantity of the fluid required can be readily forced into the cutaneous tissues with a proper syringe and needle. The short, small gauge needles and ordinary hypodermic syringes used for the intradermal test are suitable for the intrapalpebral test. The animal to be tested should be properly secured and held by an assistant by the nose or with the aid of a bull staff, in the case of nervous animals, while a second assistant holds the head by the ears or horns. The head is turned so that the left eye is almost in a horizontal position. The injection is then made by securing the fold of the skin of the lower eyelid of the left eye between the thumb and index finger and inserting the needle parallel with the margin of the eyelids. The dose of tuberculin to be injected is $\frac{1}{4}$ c.c. It is essential to make the injection into the skin proper and not under the skin. Another method we have used is to draw the skin of the lower eyelid taut over the zygomatic ridge and then insert the needle as described above. The point of injection is about $\frac{3}{4}$ of an inch from the inner canthus of the eye and about $\frac{1}{2}$ inch below the margin of the lower eyelid.

From the limited observations made on this test it appears that further experimentation is justified and should additional experience prove the test to be sufficiently accurate for diagnostic purposes, it could be employed either in place of the subcutaneous or as a supplementary test to the latter method.

THE ATTENDANCE

MEMBERS

Arizona—C. D. McMurdo; J. C. Norton.

California—R. A. Archibald; A. S. Almeida; J. F. Ast; D. H. Bergh; P. H. Browning; James Boyd; G. W. Closson; Bert J. Cady; J. A. De Serpa; S. A. Doyle; Geo. J. Donnelly; L. A. Danielson; Wm. F. Egan; A. F. Eagle; Peter I. Egan; David F. Fox; Carl W. Fisher; P. W. Goodwin; Fred H. Guldager; J. J. Hogarty; C. M. Haring; H. J. Hammond; F. M. Hayes; Geo. H. Hart; Leo O. Henrich; H. H. Hicks; Wm. P. Jackson; J. P. Iverson; Charles Keane; Oscar J. Kron; Geo. H. Locke; Otis A. Longley; Daniel Matracoe; John F. McKenna; K. F. Meyer; F. H. McNair; W. G. Oliver; M. J. O'Rourke; W. R. O'Neal; Normal Neilson; Dr. Plummer; J. E. Quinn; I. B. Paxton; Thos. T. Rundle; Geo. S. Rey; C. L. Roadhouse; J. O. Stiner; Chas. H. Sears; Chas. R. Simpson; F. N. Sawyer; A. I. Sorenson; H. F. Spencer; W. J. Taylor; H. E. Torgersen; W. M. Thompson; J. Traum; Chas. C. Wing; H. J. Washburn; J. L. Zeiler.

Colorado—F. C. Guyselman; I. E. Newsom; A. J. Savage.

Canada—C. D. McGilvray; F. Torrance; J. G. Rutherford.

Hawaii—Victor A. Norgaard.

Idaho—J. R. Fuller; Ray B. Hurd; Walter A. Sullivan.

Illinois—A. H. Baker; D. M. Campbell; Joseph Hughes; Geo. B. Jones; N. S. Mayo.

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Iowa—H. S. Murphey; C. H. Stange.

Louisiana—W. H. Dalrymple.

Maine—W. L. Mebane.

Massachusetts—Langdon Frothingham.

Michigan—S. Brenton; C. C. Dauber; Geo. W. Dunphy; James Drury; Richard P. Lyman.

Missouri—J. G. Eagle; A. F. Kinsley; C. Jensen; R. C. Moore; S. Stewart.

Montana—A. D. Knowles.

New York—Robert W. Ellis; Otto Faust; V. A. Moore; E. Rafter.

Nevada—Stephen Lockett.

New Jersey—Geo. B. Vleit; A. G. Vogt.

North Dakota—Jacob Van de Ewe.

Oklahoma—Chas. H. Jewell.

Ohio—John H. Blattenberg; W. G. O'Harra; E. H. Shepard.

Oregon—William H. Lytle; Geo. C. Mitchell; B. T. Simms; W. D. Wright.

Pennsylvania—E. P. Althouse; W. Horace Hoskins; R. L. Kann; C. J. Marshall; F. H. Schneider; S. E. Weber.

South Dakota—C. A. Leslie.

Texas—Levi E. Johnson.

Utah—H. J. Fredericks; John Halton; N. C. Spalding.

Washington, D. C.—A. Eichhorn; J. R. Mohler.

Washington—S. B. Nelson.

West Virginia—H. B. Langdon.

Wisconsin—B. L. Clarke; R. S. Heer; W. A. Wolcott.

VISITORS

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England—E. H. Stent.

Idaho—W. S. Decker.

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Indiana—Vallorous McLeay.

Iowa—C. W. Lynne.

Kansas—Joe W. Timmen; R. Vans Agnew.

Kentucky—V. I. Safro; R. G. Mewborne.

Maine—W. H. Robinson.

Michigan—W. H. Clark; E. M. Houghton.

Missouri—J. W. Chenoweth; Albert Kinsley.

Nebraska—C. M. Day; J. A. Grau; M. D. Strong.

Nevada—R. A. Caldwell.

New Jersey—Wm. A. Flock.

New York—Norman S. Moore.

North Carolina—Hal. G. Rollins.

Ohio—M. C. McClain; W. B. Washburn.

Oregon—Geo. M. McComb; J. E. Warren; Master Garrison Mitchell.

Pennsylvania—A. L. McCloskey; John B. McCloskey; N. Rectenwald.

Texas—E. F. Jarrel.

Virginia—Rex Steele.

Washington—Geo. H. Yates.

LADIES

Arizona—Mrs. J. C. Norton.

California—Mrs. R. A. Archibald; Mrs. A. S. Almeida; Miss Nancy Baker; Mrs. P. H. Browning; Mrs. H. Bergh; Mrs. J. R. Beach; Miss Madge Bryson; Mrs. G. H. Closson; Mrs. L. A. Covel; Mrs. J. J. Cropper; Miss K. O. Donohue; Mrs. L. T. Danielson; Miss Bessie Feeley; Miss Honore Fleming; Mrs. Carl W. Fisher; Mrs. D. F. Fox; Mrs. Geo. C. Gross; Mrs. J. J. Hogarty; Mrs. C. M. Haring; Mrs. Wm. P. Jackson; Mrs. Harry Lawrence; Mrs. Otis A. Longley; Mrs. J. F. McKenna; Mrs. F. H. McNair; Miss Gertrude Moore; Miss Gladys Monroe; Mrs. M. C. McClain; Pauline S. Nusbaum; Mrs. Kate A. Ogden; Mrs. A. F. Oliver; Mrs. J. O. Stiner; Mrs. F. N. Sawyer; Mrs. N. C. Spalding; Mrs. C. M. Steiger; Mrs. C. R. Simpson; Mrs. A. I. Sorensen; Mrs. H. A. Spencer; Mrs. J. L. Tyler; Mrs. H. E. Torgersen; Mrs. J. Traum; Miss Rowena Traverso; Mrs. M. Wheeler; Miss Dorothy Weed; Mrs. E. C. Zickendrath; Mrs. J. L. Zeiler.

Canada—Mrs. J. G. Rutherford; Miss A. Rutherford.

Illinois—Mrs. A. H. Baker; Mrs. J. P. Dunn; Mrs. N. S. Mayo.

Indiana—Miss Odessa Jackson; Mrs. J. D. McLeay.

Iowa—Mrs. H. S. Murphey; Mrs. C. H. Stange.

Massachusetts—Mrs. L. Frothingham.

Michigan—Mrs. Wm. H. Clark; Mrs. C. C. Dauber; Mrs. James Drury; Miss Vera Runyan; Miss Eula Runyan; Mrs. G. C. Runyan.

Missouri—Mrs. Ruby Chenoweth; Mrs. G. M. Eagle; Miss Dorothy Lee Eagle; Mrs. A. T. Kinsley; Mrs. H. Jensen.

Nebraska—Mrs. C. M. Day; Mrs. J. A. Grau; Mrs. M. D. Strong.

New Jersey—Mrs. Wm. A. Flock; Miss J. A. Schmidt; Mrs. Geo. B. Vleit; Mrs. A. G. Vogt.

New York—Mrs. Robert W. Ellis; Mrs. E. Rafter.

Ohio—Mrs. W. B. Washburn.

Oklahoma—Mrs. Chas. H. Jewell.

Oregon—Mrs. G. C. Mitchell; Mrs. Mary Pitney.

Pennsylvania—Mrs. A. J. McCloskey; Mrs. C. J. Marshall; Mayme Rectenwald; Maisie Rectenwald; Mrs. W. Horace Hoskins.

Washington—Mrs. Geo. H. Yates; Mrs. S. B. Nelson.

Washington, D. C.—Mrs. H. J. Washburn.

Wisconsin—Mrs. B. L. Clarke; Mrs. R. S. Heer; Muriel Heer; Mrs. W. A. Wolcott.

NEW MEMBERS

Name.	Address.	College.	Year of Graduation.
Abercrombie, Henry E.	Cambridge, Ill.	McKillip Vet. Col.	1914
Adams, John Dawson	Genesee, Idaho	Washington St. Col.	1910
Allen, George H.	St. Joseph, Mo.	K. C. Vet. College	1911
Alford, Simon Wayne	Lincoln, Neb.	K. C. Vet. College	1910
Anderson, Cecil S.	Ottawa, Ont.	Ontario Vet. College	1906
Anderson, L. J.	Centerville, Cal.	San Francisco Vet. College	1915
Anderson, M. O.	St. Joseph, Mo.	Ontario Vet. College	1886
Arburna, Joseph M.	Sonoma, Cal.	San Francisco Vet. College	1915
Ashbaugh, Frederick M.	Washington, D. C.	U. S. Col. Vet. Surgeons.	1904
Aymond, Sidney Clay	Bunkie, La.	U. S. Col. Vet. Surgeons.	1912
Baddeley, Joseph C.	Walla Walla, Wash.	U. S. Col. Vet. Surgeons.	1908
Bailey, Leon L.	Lowell, Ind.	McKillip Vet. Col.	1913
Baker, Guy G.	Spencer, Iowa	Iowa St. College	1907
Baker, Robert Ernest	Biddle, Va.	U. S. College of V. S.	1914
Bales, Harold W.	Liberty, Miss.	Kans. St. Agr. Col.	1909
Balke, Ernest J.	Adam, Neb.	St. Joseph Vet. Col.	1914
Barnett, William A.	Clemson, College, S. C.	Ohio St. Univ. V. C.	1913
Barnhart, Emmett P.	Cleveland, Ohio	Ohio State Univ. V. C.	1907
Bayler, Theodore M.	Kankakee, Ill.	Chicago Vet. College	1911
Beavers, Joseph A.	Canton, Miss.	V. C. Vet. College	....
Beattie, Joseph Gilmore	North Portland, Ore.	K. C. Vet. College	1905
Bell, Ralph Mack	Berkeley, Cal.	N. Y. State Vet. Col.	1909
Biggs, Anson W.	South Omaha, Neb.	K. C. Vet. College	1908
Bolender, Fred Jourette	Galveston, Tex.	U. S. C. of V. S.	1914
Brandenberg, T. O.	Lakota, N. D.	N. Y. State Vet. College	1913
Branson, Roscoe A.	Wichita, Kans.	Kans. St. Agr. College	1911
Brashier, Earl S.	Chicago, Ill.	Chicago V. C.	1913
Brookbank, Roscoe E.	Washington, D. C.	U. S. C. of V. S.	1909
Brown, Sylvester	Traverse City, Mich.	Chicago Vet. Col.	1912
Buller, John J.	Santa Monica, Cal.	San Francisco, V. C.	1914
Burdett, Cyril H.	Centralia, Kans.	K. C. Vet. College	1911
Burns, Albert H.	Hepler, Kans.	St. Joseph Vet. Col.	1914
Burkland, Herman W.	Atlanta, Ga.	Ohio St. Univ.	1911
Cady, Bert J.	Berkeley, Cal.	N. Y. State Vet. Col.	1904
Carnite, James S.	Fert Plain, N. Y.	N. Y. S. V. College	1914

Name.	Address.	College.	Year of Graduation.
Carter, E. B.	Austin, Minn.	Chicago Vet. Col.	1912
Carter, Rolla E.	Grant, Neb.	St. Joseph Vet. Col.	1909-14
Casper, Geo. T.	Albuquerque, N. M.	McKillip Vet. Col.	1905
Chamberlin, Leroy M.	Washington, D. C.	U. S. C. of V. S.	1914
Channing, Chas. E.	Washington, D. C.	U. S. C. of V. S.	1909
Chreve, Raymond M.	Panora, Iowa	Chicago Vet. Col.	1910
Christian, Robert V.	Manhattan, Kans.	Kans. St. Agr. College	1911
Cline, Clifford M.	Maryville, Mo.	St. Joseph Vet. Col.	1910-14
Collett, Howard B.	Calgary, Canada	Ontario V. C.	1911
Collins, Fred W.	Pawnee City, Neb.	K. C. V. C.	1913
Collins, Frank	Monroe, La.	Chicago V. C.	1908
Corbin, Cecil J.	Pawling, N. Y.	N. Y. State Vet. Col.	1911
Commings, Frederick E.	San Francisco, Cal.	S. F. Vet. College	1910
Corwin, George E.	Canaan, Conn.	U. S. C. of V. S.	1903
Corcoran, Michael	Augusta, Kans.	St. Joseph V. C.	1914
Cottrill, Roy B.	Sand Fork, W. Va.	U. S. C. of V. S.	1914
Cox, Walter P.	Baltimore, Md.	U. S. C. V. S.	1911
Crane, Adelbert G.	Chicago, Ill.	McKillip's V. C.	1913
Davis, Harry E.	Arlington S. D.	McKillip's V. C.	1914
Deiling, N. J.	Dallas Center, Ia.	Iowa State College	1908
Day, Frank J.	Washington, D. C.	U. S. C. of V. S.	1914
Dellert, R. B.	Winnipeg, Man.	Ontario V. C.	1910
Dillahunt, Peter A.	Springfield, Ohio	Ontario V. C.	1893
Doran, John T.	Beatrice, Neb.	St. Joseph V. C.	1909
Drury, James	Ypsilanti, Mich.	Ontario Vet. Col.	1891
Eagan, Paul H.	Eugene, Ore.	Colorado St. Agr. Col.	1912
Eatman, O. R.	Gadsden, Ala.	McKillip V. C.	1909
Edelin, Allen A.	Washington, D. C.	U. S. C. of V. S.	1914
Edmunds, Arthur L.	Franklin, N. H.	Chicago V. C.	1907
Egan, John M.	San Francisco, Cal.	S. F. Vet. College	1912
Ellis, Percy L.	Merrill, Ia.	Iowa St. College	1913
Elsey, Mark A.	Marion, Ohio	Ohio St. Vet. Col.	1909
Essex, John J.	Chevy Chase, Md.	Geo. Washington Univ.	1914
Feeley, Robert O.	Clemson College, S. C.	New York American	1906
Ferguson, Chas. W.	Auburn, Ala.	Chicago Vet. Col.	1910
Ferneyhough, R. E.	Warrenton, Va.	U. S. C. of V. S.	1907
Ferro, R. B.	Cardenas, Cuba	K. C. V. C.	1907
Fitch, Earl W.	Arcade, N. Y.	N. Y. S. Vet. Col., Cornell	1909
Folsom, Jr.	Fairmont, W. Va.	Ontario V. C.	1908
Foster, J. D.	Newtown, Pa.	U. S. C. of V. S.	1903
Foster, Samuel B.	Portland, Ore.	Washington St. Col.	1910
Freeman, F. E.	Buhl, Idaho	Ontario V. C.	1907
Forbes, S. D.	Alexandria, Va.	Geo. Washington Univ. V. C.	1914
Frost, Roy C.	Washington, D. C.	U. S. C. of V. S.	1914
Fuller, John R.	Weiser, Idaho	Kans. St. Agr. Col.	1912
Gallagher, John J.	Lowelock, Nev.	N. Y. S. V. C.	1904
Galloway, Peter F.	Richmond, Va.	U. S. C. of V. S.	1914
Gamble, Henry S.	Washington, D. C.	U. S. C. of V. S.	1908
Gates, Wm. L.	Clarksdale, Miss.	Ontario Vet. Col.	1908
Giffey, Joe W.	Omaha, Neb.	K. C. V. C.	1912
Greenwald, Geo. J.	Likhom, Wis.	McKillip Vet. Col.	1912
Golding, Cyril	Dinuba, Cal.	S. F. Vet. Col.	1911
Gordon, George	Chicago, Ill.	Chicago V. C.	1914
Gordon, William D.	San Jose, Cal.	S. F. Vet. Col.	1914

Name.	Address.	College.	Year of Graduation.
Graf, John.....	Elma, Iowa.....	McKillip's V. C.....	1914
Graham, Leroy B.....	Cedar Rapids, Ia.....	St. Joseph V. C.....	1909
Graham, Oswald H.....	Scranton, S. C.....	Vet. Dep. Ohio St. Univ..	1914
Grapp, Gustav H.....	Port Deposit, Md.....	U. S. C. of V. S.....	1907
Groff, Benjamin W.....	Massillon, Ohio.....	Ontario Vet. College.....	1898
Grossman, James D.....	Ames, Ia.....	Ohio St. Uni. Vet. Dept..	1914
Gruber, John T.....	Marion, Ohio.....	O. S. U. Vet. Col.....	1908
Guard, Willard F.....	Ames, Iowa.....	O. S. U. Vet. Col.....	1912
Guyselman, P. C.....	Monte Vesta, Col.....	Colorado Agr. Col.....	1912
Hallman, Elam T.....	East Lansing, Mich....	Ala. Poly. Inst. Vet. Dept	1910
Halstead, Wm. E.....	Binghamton, N. Y....	U. S. C. of V. S.....	1914
Hassloch, August C.....	New York City.....	N. Y. C. of V. S.....	1891
Haworth, Chas. C.....	Donnellson, Ill.....	Chicago, V. C.....	1910
Hayden, Chas. E.....	Ithaca, N. Y.....	N. Y. State V. C.....	1914
Hayes, Jesse.....	Alexandria, Va.....	Geo. Washington Univ...	1914
Hazelwood, Robert V....	Bessemer, Ala.....	Cincinnati Vet. Col.....	1910
Henderson, Levi C.....	Twin Falls, Idaho.....	K. C. V. C.....	1904
Hill, George H.....	Atkinson, Ill.....	Chicago V. C.....	1911
Hoekzema, Otto F.....	McBain, Mich.....	Grand Rapids, V. C.....	1909
Hollander, Ferdinand...	New Orleans, La.....	Chicago Vet. College.....	1914
Hollingsworth, Fred. H..	Council Bluffs.....	U. S. C. of V. S.....	1904
Hollister, Wm. L.....	Avon, Ill.....	Chicago V. C.....	1910
Houck, N. G.....	Washington, D. C.....	U. of P.....	1895
Hull, Martin.....	South St. Joseph, Mo.	S. F. V. C.....	1913
Hurd, Ray B.....	Payette, Idaho.....	K. C. V. C.....	1908
Huthman, G. H.....	Portland, Ore.....	S. F. Vet. Col.....	1911
Jervis, James G.....	Vancouver, B. C.....	Ontario V. C.....	1912
Jung, Otto E.....	Oklahoma City, Okla.	Kansas City, V. C.....	1908
Jungerman, Geo. F.....	Morrill, Kans.....	Kansas City V. C.....	1908
Kaylor, James M.....	Barry, Ill.....	Chicago V. C.....	1893
Keller, T. O.....	Ridgeville, Ind.....	McKillip's V. C.....	1912
Kelsey, Harry R.....	Newport News, Va....	U. S. C. of V. S.....	1910
Kelf, E. M.....	Winters, Cal.....	S. F. V. C.....	1913
Kelser, Raymond A.....	Washington, D. C.....	Geo. Washington Univ...	1914
Keneday, Frank T.....	Twin Falls, Idaho.....	Ontario V. C.....	1908
Kern, Harry F.....	Manila, P. I.....	Colo. Agri. College.....	1911
Kettlehon, Arthur H....	Columbus, Wis.....	McKillip's V. C.....	1915
King, Samuel A.....	Washington, D. C.....	U. S. C. of V. S.....	1914
King, William M.....	San Francisco, Cal....	S. F. V. C.....	1913
Kinsey, George W.....	Wheeling, W. Va.....	M. A. C. and C. V. C....	1891
Kirby, Amos C.....	Hannah, N. Dak.....	Grand Rapids V. C.....	1910
Kocher, Frank T.....	Sunbury, Pa.....	Univ. of Pa., Vet. Dept..	1915
Ladson, Thomas A.....	Hyattsville, Md.....	U. S. C. of V. S.....	1905
Landon, Frank M.....	Gr. Barrington, Mass..	U. S. C. of V. S.....	1903
Langford, Samuel M....	Martinsburg, W. Va..	Ontario V. C.....	1912
Lassen, Christian W....	Pendleton, Ore.....	McKillip's V. C.....	1906
Lee, Walter H.....	Brundidge, Ala.....	Ala. Polytechnic Inst....	1910
Leith, Thos. S.....	Goldfield, Ia.....	Iowa St. College.....	1914
Lenley, George G.....	Omaha, Neb.....	Chicago V. C.....	1913
Lenfestey, John H.....	Lyons, Ohio.....	Chicago V. C.....	1912
Leonard, Milton M.....	Asheville, N. C.....	Cornell University.....	1914
Lewis, Walter K.....	Columbia, S. C.....	Ontario Vet. College.....	1900
Lewis, Watson F.....	Indianapolis, Ind.....	Cornell Univ.....	1907
Lipp, Carl F.....	Napeville, Ill.....	Kansas City V. C.....	1913

Name.	Address.	College.	Year of Graduation
Lothe, Herbert.....	Madison, Wis.....	Ohio St. Uni. V. C.....	1913
Love, Grover V.....	Chalmers, Ind.....	McKillip's V. C.....	1911
Lovejoy, J. E.....	Washington, D. C.....	U. S. C. of V. S.....	1909
Lowrey, F. H. S.....	Montreal, Que.....	Ontario V. C.....	1905
McAlister, R. C.....	Corvallis, Ore.....	Washington State College.	1909
McCaughy, Nat W.....	Horicon, Wis.....	U. S. C. V. S.....	1914
McClelland, Alfred H.....	Walton, N. Y.....	N. Y. State Vet. Col.....	1912
McClelland, Frank E.....	Buffalo, N. Y.....	N. Y. State Vet. Col.....	1900
McCord, Frank A.....	Edmonton, Alberta ..	Ontario V. C.....	1910
McCowen, D.....	Edgeley, N. D.....	Kansas City Vet. Col.....	1913
McCoy, Ellis E.....	Clay Center, Kans.....	Kansas City Vet. Col.....	1907
McNaughton, D. D.....	Devil's Lake, N. D.....	McGill Univ. Vet. Dept.....	1892
Major, John P.....	Anderson, S. C.....	Ala. Polytechnic Institute.	1913
Mansfield, Chas. M.....	Washington, D. C.....	U. S. C. of V. S.....	1907
Marquis, F. M.....	Oakland, Cal.....	S. F. V. C.....	1907
Mason, Wm. D.....	Elko, Nev.....	Washington St. Col.....	1906
Mattrocal, Daniel.....	Madera, Cal.....	S. F. V. C.....	1914
Mauer, George C.....	Cleveland, Ohio.....	Ohio St. Univ.....	1892
Maze, Luther A.....	Chelsea, Mich.....	Ontario Vet. Col.....	1911
Meads, F. F.....	Enid, Okla.....	Grand Rapids Vet. Col.....	1911
Meyst, Frederick W.....	Washington, D. C.....	U. S. C. of V. S.....	1909
Middleton, Asa C.....	Grundy Center, Ia.....	McKillip's.....	1908
Millen, Chas. J.....	Cleveland, Ohio.....	N. Y. State Vet. Col.....	1903
Miller, Thos. C.....	Walhalla, N. D.....	St. Joseph Vet. Col.....	1908
Molgard, Peter C.....	Ruskin, Neb.....	K. C. V. C.....	1914
Morehouse, Walter G.....	Salem, Ore.....	N. Y. State Vet. Col.....	1907
Mount, Willet G.....	Red Bluff, Cal.....	S. F. V. C.....	1914
Muller, J. Herman.....	Washington, D. C.....	U. S. C. of V. S.....	1909
Munce, Thos. W.....	Washington, Pa.....	Univ. of Pennsylvania.....	1915
Murphy, Joseph W.....	Columbia, S. C.....	Chicago Vet. Col.....	1905
Myers, Harry E.....	Fostoria, Ohio.....	Ontario Vet. Col.....	1905
Mydland, Gustav H.....	Everest, Kans.....	Kansas Sta. Agr. Col.....	1914
Nash, Elmer D.....	Helena, Mont.....	Grand Rapids, Vet. Col.....	1900
Newman, Lloyd V.....	York, Neb.....	Kansas City Vet. Col.....	1912
Paine, Harold.....	Rosetown, Sask.....	Ontario Vet. Col.....	1897
Parrish, Roscoe D.....	Omaha, Neb.....	Kansas Agr. Col.....	1914
Parrish, William W.....	Tampa, Fla.....	Auburn A. P. I.....	1913
Pearce, Frank H.....	Carson, Ia.....	St. Joseph Vet. Col.....	1913
Phelps, Chas. D.....	Clear Lake, Ia.....	Chicago Vet. Col.....	1911
Phelps, Oliver J.....	Lexington, Ky.....	Cincinnati Vet. Col.....	1915
Pickens, Earl M.....	Illinois, N. Y.....	N. Y. S. V. C.....	1908
Pirie, Leslie D.....	Bellevue, Cal.....	S. F. V. C.....	1914
Pritchard, John W.....	Fessenden, N. D.....	McKillip's.....	1910
Pritchett, Lamor F.....	Auburn, Ala.....	Ala. Poly. Inst.....	1913
Prucha, Joseph V.....	.....	N. Y. S. V. C., Cornell.....	1907
Quinn, P. E.....	Indianapolis, Ind.....	Cincinnati V. C.....	1903
Reihart, Oliver F.....	Omaha, Neb.....	Chicago Vet. Col.....	1915
Reynolds, Francis.....	Washington, D. C.....	Geo. Washington Univ.....	1914
Ricebarger, Benj. F.....	St. Charles, Ill.....	Toronto Vet. Col.....	1906
Roberts, Jas. W.....	Davis Creek, Cal.....	S. F. V. C.....	1915
Robinson, Edwin A.....	Petersburg, Va.....	U. S. V. C. of V. S.....	1914
Ross, Crittenden.....	New York City.....	Iowa State College.....	1914
Ross, Harry H.....	Winnipeg, Can.....	McKillip's.....	1914
Roshon, Harry B.....	Reading, Pa.....	Univ. of Pa.....	1907

Name.	Address.	College.	Year of Graduation
Roswell, Wm. L.	Corry, Pa.	Univ. of Pa.	1914
Roueche, R. C.	Cleveland, Ohio.	Chicago Vet. Col.	1906
Ryan, Frank C.	Washington, D. C.	U. S. C. of V. S.	1914
Sevenster, John	Hamburg, Iowa	U.S.V.C. and McKillip's	1891-1905
Severovic, Mirko F.	Chicago, Ill.	McKillip's	1914
Schader, Curtis H.	Sunnyside, Wash.	Chicago Vet. Col.	1912
Schaefer, G. L.	Wansa, Neb.	K. C. V. C.	1913
Schermerhorn, Robt. J.	Redlands, Cal.	S. F. V. S.	1914
Schleich, Fred. H.	Williamsport, Ohio.	Ohio St. Univ.	1914
Schneider, Francis O.	Nicholasville, Ky.	Cincinnati Vet. Col.	1914
Schucengost, Robt. H.	Swea City, Iowa	McKillip's	1914
Shartle, Walter W.	Indianapolis, Ind.	Indiana Vet. Col.	1909
Shikbs, Ernest A.	Dearborn, Mo.	Chicago Vet. Col.	1911
Shillinger, Jacob E.	Easton, Md.	Geo. Washington Col.	1914
Sims, Frank C.	Aurora, Neb.	Kansas City Vet. Col.	1910
Stamp, Ashley G.	Parma, Idaho	Kansas City Vet. Col.	1915
Staab, John J.	Cleveland, Ohio	McKillip's	1914
Steel, Edward R.	Chester, Neb.	N. Y. State Vet. Col.	1914
Stevens, Guy G.	Groton, N. Y.	N. Y. College	1911
Stickel, Wm. E.	Etna Mills, Cal.	S. F. Vet. Col.	1913
Stouffer, David F.	Bellevue, Neb.	Kansas City Vet. Col.	1906
Stroup, Wm. L.	Corinth, Miss.	Ala. Poly. Inst.	1912
Sugg, Redding S.	Rocky Mount, N. C.	Ala. Poly. Inst.	1915
Taylor, Lawrence L.	Condon, Ore.	McKillip's	1909
Teil, John A.	Hatton, N. D.	Chicago Vet. Col.	1912
Thompson, John A.	Manila, P. I.	Kansas City Vet. Col.	1907
Thornton, Edward L.	Fort Kent, Me.	U. S. C. of V. S.	1907
Trigg, Wm. S.	Washington, D. C.	Geo. Washington Univ.	1914
Tripper, H. A.	Walla Walla, Wash.	McKillip's	1907
Turlington, John A.	Melfa, Va.	U. S. C. V. S.	1910
Tyler, John L.	Pomona, Cal.	Chicago Vet. Col.	1891
Walmsley, F. D.	Utica, N. Y.	N. Y. S. V. Col.	1904
Ward, Victor	Paso Robles, Cal.	S. F. V. C.	1912
Watson, Thos. W.	Hillsboro, Texas.	Ontario Vet. Col.	1901
Webb, A. J.	Ogden, Utah.	Ohio St. Univ.	1911
Webber, O. B.	Rochester, N. Y.	N. Y. St. Vet. Col.	1912
Webster, Wm. O.	Utica, Ohio.	McKillip's	1914
Weeks, Cornelius C.	Washington, D. C.	U. S. C. of V. S.	1906
Wershow, Max.	Columbus, Ohio.	Ohio State Univ.	1913
White, Logan A.	Sioux Rapids, Ia.	Iowa St. Univ.	1914
White, V. C.	Blackfoot, Idaho	Ohio St. Univ.	1911
Whiteman, Harry J.	Latrobe, Pa.	Univ. of Pennsylvania	1912
Whitney, A. Homer	Narka, Kans.	Kans. St. Agr. Col.	1912
Williams, Geo. M.	Boone, Iowa	Chicago Vet. Col.	1912
Wintringham, Henry B.	Petaluma, Cal.	S. F. V. C.	1914
Wood, Ezra P.	Charlottesville, Va.	U. S. C. of V. S.	1908
Wood, Frederick W.	Manila, P. I.	N. Y. S. V. C.	1907
Zell, Charles A.	Chicago, Ill.	Royal V. C. of Munich	1900
Zickendrath, Ernest C.	Palo Alto, Cal.	S. F. Vet. Col.	1911

(To be continued in the next issue.)

NORTH DAKOTA VETERINARY ASSOCIATION.

The fourteenth annual meeting of the above association was held in the Veterinary Building, Agricultural College, Fargo, August 4-5. The meeting was called to order by President Farmer, and about forty members were present.

Several well prepared papers were presented; among the more interesting was Dr. C. C. Jackson's paper on "Dourine." Dr. Jackson, as an agent for the Live Stock Sanitary Board, has been doing considerable work in conjunction with the B. A. I. in the eradication of this disease in the western part of the state and was familiar with his subject. A good discussion followed.

Dr. Geo. R. White, State Veterinarian of Tennessee, was present both days, and on Wednesday afternoon gave stereoptican demonstrations on the castration of cryptorchids, mules, ruptured boars and an operation for inguinal hernia on boars not necessitating castration. On Thursday morning Dr. White gave his lecture and demonstration on "Surgical Restraint of Domestic Animals." This lecture was alive with interest and was enjoyed by all present.

The association now has a membership of almost one hundred. The next meeting will be held at Fargo the last week of July, 1916.

The following officers were elected: Drs. R. E. Shigley, President, Kenmare; R. S. Norton, Vice-President, Velva; B. C. Taylor, Treasurer, Hillsboro; W. J. Mulroony, Secretary, Havana.

W. J. MULROONY, Secretary.

CONNECTICUT VETERINARY MEDICAL ASSOCIATION.

The 1915 summer meeting of the Connecticut Veterinary Medical Association was held at New Haven on Thursday, August 12. The members gathered at the hospital of Dr. George L. Cheney, where several interesting cases were presented for diagnosis. Following the clinic and a buffet lunch, the members boarded a launch which had been chartered for the occasion and sailed to Mansfield's Grove, where they enjoyed a very excellent shore dinner. This was followed by a sail to Savin Rock, another shore resort near New Haven, where the party spent a very enjoyable evening.

The attendance was very good, no business meeting was held.

The annual meeting will be held at Hartford on the first Tuesday in February, 1916.

A. T. GILYARD, Secretary.

NEWS AND ITEMS.

ATTENTION is called to the fact that the AMERICAN VETERINARY REVIEW has become the official organ of the American Veterinary Medical Association and will hereafter be published at Ithaca, N. Y., under the name of the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION. All communications, remittances, etc., in future, should be addressed to Dr. P. A. Fish, editor, Ithaca, N. Y.

NORTHWEST IOWA VETERINARY ASSOCIATION met in Sioux City the end of August, when 40 or 50 veterinarians from surrounding cities congregated there and held a clinic at Dr. J. N. Litchy's place. All owners of lame horses were invited to bring their animals for free examination, says the Sioux City, *Iowa, News*.

CONDUCTS FIVE THOUSAND REMOUNTS; HAS SHIP SUNK AT END.—Dr. E. R. Forbes, British veterinary surgeon (formerly State Veterinarian of Texas), after safely conducting to England in eight months' time five thousand remounts, had his ship submarined and sank August 19 fifty miles at sea off the Coast of Cornwall. Dr. Forbes is now examining army horses at Cincinnati, Ohio.

ANTHRAX VICTIM REPORTED IS IMPROVING.—Dr. Carl Viers, a veterinarian, of Vermillion, S. D., who has been suffering with anthrax, a cattle disease, in a local hospital, is improving steadily. Dr. Viers contracted the disease by rubbing a mosquito bite at the time he was operating on the carcass of a steer that had succumbed to anthrax. A portion of the flesh of his left arm was removed to prevent a spread of the malady.—Sioux City, *Iowa, News*.

DR. HENRY JÜEN IS MADE BORDER CATTLE INSPECTOR.—Dr. Henry Jüen, of Belleville, has been appointed an inspector of cattle on the Mexican border. He departed for El Paso, Tex., Wednesday. Dr. J. H. Maloney, of East St. Louis, will accompany Dr. Jüen.

Both veterinarians will inspect cattle shipped into the United States from Mexico. Dr. Jüen is a son of Mr. and Mrs. Henry Jüen, of South Spring street, Belleville.—St. Louis, Mo., *Times*.

JOURNAL

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Assn.)

PIERRE A. FISH, Editor

ITHACA, N. Y.

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The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

VOL. XLVIII, N. S. VOL. I. NOVEMBER, 1915.

No. 2.

RETROSPECT AND PROSPECT.

In any organization for the community of interest there must be a leading spirit—one who is farsighted enough to see not only the need of the times but the possibilities of the future, one who has sufficient energy and persistence to translate dreams into acts.

From the old world there came one who possessed not only ideals but energy and by idealizing the real he has been able to realize the ideal, at least relatively, in veterinary organization. It is doubtful if Dr. Liautard, as an active participant in the formation of the U. S. Veterinary Medical Association, fully appreciated the chance of its later development into the American Veterinary Medical Association and the possibilities opened up for welding the veterinary profession of this and adjacent countries into a more capable and homogeneous mass.

Five or six decades ago the veterinary material of this country was decidedly raw from an educational standpoint as compared with European standards. The diagnosis was easy to Dr. Liautard's clear vision and as a remedy he organized one, if not the first of the veterinary schools which has survived. Education, then as now, is fundamental to real progress.

Emphasizing the educational ideal, he later established the *American Veterinary Review*, which at the outset was the official organ of the U. S. Veterinary Medical Association. In 1890 an

extra number of the *Review* was printed, devoted exclusively to the proceedings and papers presented at the first meeting of the association held in Chicago. (The twenty-seventh annual meeting of the association.) From the records this appears to be the first separately printed volume of the proceedings. In subsequent years the association, with its growing membership, printed its own proceedings and the official connection of the *Review* became less apparent. From an historical standpoint it, therefore, seems fitting that the association in considering the abandonment of its separate volume of proceedings, which because of its considerable size, was beginning to cost about as much as the annual dues amounted to, and to substitute a *Journal* for it, that the old relations with the *Review* should be considered and this publication taken over for the use of the association.

Even in the separate volume of the proceedings it was necessary to abridge the transactions of the meetings and this abridgement must, of necessity maintain in the new *Journal*. The essential items must be presented and there must be space for contributions if the periodical is to be a *Journal* in fact as well as name. It will be our aim to strike a happy medium in this respect, to omit no item of importance of the association's affairs, and yet have a sufficient variety of articles of timely interest to appeal to the progressive practitioner, who, after all, is the bulwark of the profession.

The prospect offers promise. The association member in paying his dues contributes not only to the support of the association, but to the uplift of the profession and receives in return a periodical which keeps him informed of its activities. The practitioner who is not a member may acquire information beyond his own narrow sphere and keep in touch with the profession as a whole, and ultimately see that the association needs him and he needs the association to complete and round out his career. As a unit working in mass formation for the betterment of the profession he will find his efforts productive of more fruitful results than anything he can hope to accomplish in his individual isolation.

In transferring the office of publication from New York City to Ithaca, N. Y. in a limited time, many details are involved which unavoidably tend to delay. Time is required for tabulating the proceedings of the meeting and the papers and discussions there presented, and much work is thrown upon the stenographer in a short space of time before the material can be available for the

Journal. From the necessities of the case the first number of the new volume had to be issued by Doctor Ellis, at some inconvenience, from the New York office. There has been unavoidable delay in performing some of the arrangements at the new office of publication and some indulgence must be asked. Our acknowledgements are due Doctor and Mrs. Ellis for the assistance they have rendered in overcoming these delays as much as possible, and endeavoring to make a difficult task easier.

It has not been our desire to inaugurate violent changes as regards the form and appearance of the *Journal*. Some may be desirable, others unavoidable. We prefer a gray cover because that is the academic color for veterinary medicine. Typographical change and re-arrangement of material is more or less necessary under new conditions.

An important function of any veterinary periodical is the educational one of disseminating knowledge of recent facts in practice, therapeutics and general matters pertaining to the profession. A broad-minded practitioner should include in his study the representative journals of his own country, and at least make an effort to get in touch with one of the foreign journals; but for community of interest there must also be due consideration for the ordinary and every day affairs that touch all practitioners.

For the future we ask the co-operation of all members of the profession. Any success worth having must be based on truth, progress and efficiency. With co-operation all prejudice may be overcome. America should have a foremost place in the world-brotherhood of veterinarians.

P. A. F.

SUTURES AND SUTURING*

J. V. LACROIX, Kansas City, Mo.

For the purpose of joining tissues wherein there has been effected solution of continuity, sutures, of some kind have long been employed to procure prompt coaptation of wound margins. The term "suture" is applicable to material employed in the process of joining tissue as well as to the joined structures after coaptation has been effected; consequently, in one sense, there is no great difference in the significance of the terms "sutures" and "suture materials." We shall limit our consideration of suture materials to those commonly employed.

Suture materials are of vegetable, animal and metallic origin. Of vegetable origin, we have linen thread put up for use in various ways, and this constitutes a very strong and durable agent that is particularly serviceable in uniting surface wounds in thick-skinned animals. Linen thread is very effective when employed as a ligature for bulky masses of tissue, but it becomes very dense after having been *in situ* for a few hours and is quite prone to cut through tissue encompassed when tension is great. However, it is a very serviceable material for emergency work upon the large animals and does not become absorbed even when buried in the tissues. For the purpose of reenforcing marginal sutures, linen tape is very useful, since because of its shape, it does not readily cause pressure necrosis under tension.

Of animal origin, the materials usually employed are gut, kangaroo tendon and silk. Gut is very frequently employed and when not treated in any one of the numerous ways to retard its absorption, will become absorbed in a few hours. The time required for its absorption depends upon the character of the tissues containing it and the size of the suture material. Tissue that is vascular and that tends to keep sutures in a moist state, will absorb sutures earlier than will tissue that is not so well supplied with vessels. When it is desirable to have a gut suture remain in position for several days, it is treated by being chromicized or iodinated or otherwise rendered more dense. Used in the approximation of some sub-surface wound margins, it is very dependable.

* Presented at the meeting of the A. V. M. A. Section on Practice, Oakland, Cal.

Where there exists material retraction of heavy muscular or tendinous structures attending accidental or intentional division of same, heavier suture materials are employed for effecting coaptation of the retracted margins or ends. For this purpose kangaroo tendon or other prepared fibrous animal tissue is used. However, in the use of buried sutures, due regard must be given the vascularity and bulk of tissue sutured and the amount and size of the material employed. Where tissue is vascular and tension is great, necessarily strong sutures are required. Buried gut sutures may be so inserted that because of unequal distribution of tension anemic necrosis caused by pressure is the result. Likewise an excessive amount of suture material will produce a similar effect.

Silk suture material because of its strength and soft texture, constitutes a valuable agent for almost any case where suturing is indicated. For intestinal work or fixation operations where there exists malposition of viscera of small animals, silk is very useful. For the reduction of certain herniae in the large animals, heavy braided or twisted silk suture material is often employed. Silk sutures may be buried when used for approximation of sub-surface tissue, and the superficial structures can be brought together with a separate suture, and there results little or no disturbance because of the presence of this buried material if sterile.

Metallic suture materials usually employed are silver and copper wire. We shall not here consider steel in any form, nor aluminum or gold plates which are serviceable in bone surgery. For the purpose of approximating margins of cartilage when wounded, metallic sutures are very serviceable; many veterinarians employ wire for the closure of abdominal wounds of small animals in order to insure their being left *in situ* should the subject be inclined to molest the wound. In certain fractures of the jaw in the horse, copper wire may be employed to good advantage; it may be wound around the base of teeth, thereby immobilizing the affected parts.

In addition to affecting approximation of tissues that have been divided, sutures are useful in many instances in that they are the means of joining the margins of the skin where wounds have been inflicted, and in this manner there is made use of a natural protection for the underlying tissues, which would otherwise need to be protected by means of dressing material of some sort.

To render possible primary union of tissue, perfect apposition of wound margins with complete immobilization of the structures

in the immediate vicinity is essential, and the use of some kind of suture material is necessary. While in some instances it is possible to bring about this result by the use of bandages or other appliances, such measures in veterinary surgery are applicable only in wounds of the extremities.

For the purpose of accomplishing prompt healing of wounds and lessening the amount of granulation, sutures are of service even though perfect coaptation of wound margins is not effected. It is possible to train toward the normal position with sutures tissues that have been divided in such manner that approximation of the divided portion is impossible, and the result of such suturing is very desirable in some instances. An example is the suturing of the divided portions of the extensor carpi-radialis where the distal portion has been detached from adjacent structures and considerably mutilated. In such cases by retaining in a suitable position the lower portion of the tendon for a week or ten days, the tissues are trained in such manner that excessive granulation with resulting unnecessary blemishes is avoided if subjects so affected are given proper after-care.

To make possible primary union of skin and fascia protecting the sub-surface from exposure and thereby obviating danger of exuberant granulation and in some instances suppuration, sutures which approximate the margins of the skin and fascial wounds with reenforcing sutures to prevent pressure necrosis and tearing out of the marginal sutures, constitute a very practical method of treating many wounds. Where fibrous growths are removed from horses' shoulders by means of approximation of the skin and fascia, primary union of same results, and complete recovery in from two to four weeks without exposure of the underlying tissues and without suppuration, is possible. Contrast this with a similar surgical wound that is left exposed to heal by granulation.

Recently the writer removed a fibrous mass from a horse's shoulder, and facilities were not at hand for the execution of a good technic from the standpoint of asepsis. The subject was not confined except with halter and twitch: the hair was clipped from the surgical area and the parts painted with tincture of iodine; a local anesthetic of cocain was used, and the fibrous tissue was removed. An opening for drainage was made, the upper part of which was two inches below the lower commissure of the margins of the wound made for extirpation of the fibrous tissue; and the

larger opening was firmly untied by means of a glover's suture. The cavity was packed with sterile gauze which was left in position for twenty-four hours. After-care consisted in cleansing the drainage wound daily to allow free discharge of wound secretions. The horse was kept on pillar reins for ten days. Primary union of the apposed wound margins occurred in this case, which proves that with ordinary care such results should be the rule and not the exception in general practice.

For the control of hemorrhage by ligating vessels singly or by ligating *en masse*, some kind of suture material is necessary. In diminishing nutrition of the parts involved in degenerative changes such as certain forms of goiter in dogs and in mammary tumors of sows, good results are accomplished by ligating the parts affected *en masse* with a material of linen or silk, whereas in some instances radical surgical removal would fail to bring about the desired effect.

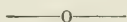
For surgical purposes, suture material is sterilized and kept so while in suitable containers, and when employed by the veterinary surgeon under certain conditions, care and skill are necessary to prevent its contamination. It is a regrettable fact that among veterinarians comparatively little suturing of surgical or traumatic wounds is done in a manner to make possible wound repair with little or no suppuration. With hemostasis and perfect coaptation and almost complete immobilization of surgically clean wound margins with provision for drainage where necessary, primary union of the contacting surfaces is the usual outcome. If tension upon sutures is not too great and where immobilization of wound margins is possible by means of reinforcing sutures of some kind, prompt and complete repair of wounds necessitating little or no after-care, is the result. The extra time and skill required in the execution of such technic is justified when after-care and results are considered.

For sub-surface coaptation of tissue, several rows or tiers of prepared gut when employed as continuous sutures are preferable to other means of suturing. With continuous sutures, a maximum degree of tension distribution is attained, and comparatively little time is consumed in suturing. However, the average veterinarian habitually employs interrupted sutures in many instances where a continuous suture would be preferable. The use of a buried, continuous suture in laparotomies of small animals precludes all pos-

sibility of herina, and where in some instances the buried suture prevents primary union of all of the surface margins, this causes no serious inconvenience to the subject.

There is no better example of the good effects to be derived by the proper employment of sutures or of the improper use of same than the contrast between the time required for complete recovery of a patient operated upon for the removal of a large shoe boil and so treated that primary union of the skin results in one case and healing by granulation takes place in the other.

An exposed granulating surgical wound is an exhibition of unskillful and barbarous methods practiced by veterinarians, who should give some real thought and effort to the improvement of their way of treatment of wounds both surgical and traumatic so that their methods of handling may become more humane and more practical.



ABSTRACT OF DISCUSSION.

DR. MCNAIR: Personally I have had considerable trouble with suture necrosis in cats and dogs. I have found that I get the best results in kittens from two to three months old. I operate upon the side entirely and while some of my cases healed by first intention, quite often there is a necrosis of the skin at the point of operation. One practitioner friend makes a small opening and coats it over with balsam. I have not tried that but it has impressed me.

DR. CAMPBELL: Dr. Lacroix was associated with me in practice the past summer, but I do not recall his saying anything to me in regard to the necrosis of the skin of cats. He has performed the operation of Caesarean section on seven, I think, and has had healing by first intention. I believe he uses very little suture material and perhaps that has something to do with it. The inner structures are caught up with one continuous suture and the needle passed through just a few times and the whole securely bandaged with gauze. Contrary to my expectation the bandages have not been pulled off and the healing has been very satisfactory.

DR. BLATTENBERG: The subjects we have to deal with—their uncleanly existence, their unwieldy proportions, their unyielding dispositions, all these make it very difficult to bring about first union. The conditions which seem absolutely necessary for bringing about this union is simply cleanliness, asepsis. Hemostasis interferes with union because the capillary oozing does so much

toward retarding union by first intention. A capillary oozing in the walls brings tension. Antiseptics in the wound retard immediate healing to a great extent. Immobilization is necessary because it does not take very much to separate the capillary circulation that should be transmitted. The suturing does its work but hemostasis and lack of immobilization tend to destroy its good effects. It is wonderful what we can bring about if we can effect immobilization.

DR. TYLER: Operating on cats has been the bane of my existence. I have the best success in closing abdominal wounds with a continuous suture; bring it up carefully and as you carry the thread through and ready to come over to another suture, give each one the same tension, as nearly as possible, and leave it in a rather flaccid condition and allow for the swelling; the continuous suture seems to make an even pressure. For a long time in horses, in heavy wounds, large masses and muscular tissues that have been severed, I have used what I am pleased to term the "button suture". I get large bone tape buttons having two large eyes, at department stores. I use a double thread in the needle, bring it through the tissue and put the thread through each eye, bring it back and tie it. The pressure comes on the buttons, which obviates, to a great extent, the rapid cutting through of the suture material. Later on, if I want to approximate the skin, with the hope of getting more rapid, smooth union, I use the uninterrupted sutures. Where large muscular tissues are cut in two, I use the button. It has been very satisfactory with me.

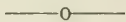
DR. C. W. FISHER: In the line of Dr. Tyler's remarks, I have used in emergency the rubbers which come on the end of the anti-toxin syringe. I have found the rubbers very useful and pressure necrosis will not occur nearly so quickly as if the suture material alone was used.

DR. BLATTENBERG: A very good way of bringing about immobility, especially in approximating the edges of a flesh wound, is to apply a layer of cotton and pour collodion over that, then another layer of cotton that reaches farther from the wound and a coating of collodion over that. If the surrounding area is wet and the collodion will not adhere, an application of alcohol soon dries the surface sufficiently so the collodion will stick.

DR. TYLER: As to shoe-boil wounds, I have never been able to suture a horse's elbow in removal of a shoe-boil but that I had

some re-formations of fibrous deposits. In regard to suturing internal wounds, as oophorectomy and the like, I used to think it not necessary to use silk. Now I use nothing else. Cut the organs off, ligate with silk and drop the parts back into the abdominal cavity. I used to think we should use cat-gut, but nature seems to take care of the silk. You need not be afraid to place the silk in the abdominal cavity if it is clean.

DR. PECK: The tension of a suture is just as important as the suture itself. Several laymen spay their own hogs in my town and I have watched them from time to time and have noticed that those who pulled tight sutures have more or less fatal results. I find in many cases a little too much tension on a suture will necessitate interference afterwards. It is better to have too little than too much tension.



THE VALUE AND METHODS OF TEACHING THE FUNDAMENTAL SUBJECTS IN THE VET- ERINARY CURRICULUM.*

H. S. MURPHEY, Ames, Ia.

Your essayist in choosing such a formidable subject did not expect to exhaust it but to bring up for discussion and solution some of the things that he believes should be considered in outlining and teaching a course in veterinary medicine at the present time, so that we may be in a better position to cope with the old and new problems. The subjects he would include are based on the assumption that the end in view is the training of men to practise or to do other work in the treatment and control of disease in animals, in other words, the foundation for special surgery, obstetrics, medicine, food inspection and sanitation. Therefore the following subjects are included: physics, chemistry, zoology, botany, anatomy, physiology, bacteriology, parasitology, pathology, clinical diagnosis, including both physical and so-called laboratory diagnosis, which is merely the use of physical, chemical, bacteriologic and pathologic methods, and pharmacology.

* Presented at the meeting of the Faculties and Examining Boards, A. V. M. A., at Oakland, Cal.

The psychologists have demonstrated experimentally and beyond doubt: 1. That the objective method of teaching is the best because the student can learn the most by that method for the time and energy spent. 2. That a given thing can be learned by fewer repetitions if there is some interval between the repetitions than if the repetitions are consecutive.

In view of these facts, our own experience and that of many others, we believe the didactic method of instruction indefensible except in those cases in which the literature is so voluminous and contradictory that the beginner could not pick the grain from the chaff. In such a case the lecture notes should be furnished the student in mimeographed or pamphlet form; as the material can be covered faster than if the student must write as dictated, also many students do not think fast enough to follow a lecturer, whereas they may get the point from careful reading. Then how shall we teach? By the quiz and laboratory methods supplementing both by references to the literature, so that the student may get this information first hand and learn to use the great storehouses of the masters: *constantly, in quizzes and laboratories the instructor must emphasize the most important things by skillful questioning and supplemental statements, keeping in mind the fact that instruction must be judged by what the student learns and not what the instructor knows.*

We are constantly running up against the "bug-bear" of "practical instruction". In foundation subjects it is largely an illusion because details must be mastered before we can generalize and *apply our knowledge*, which seems to be the central idea in so called "practical instruction". I wish to quote from an address given to this association at the Toronto meeting of the A. V. M. A by Prof. Sisson as follows:

"From a practical standpoint, a euphonious statement which often turns out to mean that he has the ability to memorize pretty well the statements found in some text-books." In other cases "practical knowledge" stands for only a vague, indefinite idea of a particular thing. Again "practical anatomy" at Johns Hopkins means gross anatomy.

In addition to pointing out some of the meanings of "practical" allow me to add that I believe that most of the things which we can learn in the fundamental subjects if taught by men who know, appreciate and can teach the problems of veterinary medi-

ciine, are of practical use. I also believe that facts, the application of which is not seen today, may be very important tomorrow; for example, a few years ago, but little attention was paid to ductless glands; now we know them to be very important and treat them accordingly, in all branches of medicine; we stumbled along for years without studying the fascial compartments, now we appreciate their importance in surgery and hence pay careful attention to them in anatomy. Some of us go so far as to say that the body is made of fascial compartments which contain other structures. I heard a very prominent physician say in an address that "if we were better scientists we would be better physicians." Did the famous Crile stumble upon the principles of anoci-association? No, he built it up step by step using knowledge gained through the application of physical, chemical, anatomical and physiologic methods.

We cannot agree under the present condition as to the amount of preparation before actual medical subjects are taken up. We believe that at least high school training at the present time is essential, and hope that before long, college training in physics, chemistry, botany, zoology and language shall be required. *We see no reason why we should lag behind the requirements and standards in human medicine, when our problems are as complex and our duty to the public as great.*

If our matriculant has not had a thorough course in the fundamentals of physics then he should have it after becoming a veterinary student.

In chemistry he should be taught enough inorganic and organic chemistry to learn the fundamental principles, the illustrative material being taken from things he will work with later, e. g. water of crystallization may be illustrated by magnesium sulphate, etc., also a thorough course in physiological chemistry is absolutely essential, this should include the digestion experiments and an examination of the normal fluids, both physically and chemically, the student should prepare his own material from the tissues himself. There is neither time nor necessity for thorough courses in the above subjects, from the standpoint of the physicist and chemist. Probably the greatest criticism of the teaching of the above subjects is *that they are not given from a medical view-point*, hence too much time is devoted to irrelevant phases of the subjects and not enough to the essential, usable things.

A general treatise of zoology should come early in the course

and it should include classification, nomenclature and method of study illustrated by laboratory work on one or two species. The same might be said of botany except that it should also include laboratory work on mitosis, absorption with various concentrations, respiration, etc., to illustrate some of the biological laws, which are difficult to learn experimentally on animals.

As I see it our weaknesses in teaching anatomy at the present time may be given as the lack of coordination, teachers not devoting their whole time to anatomy; failure to utilize all of the methods available and lack of illustrative material. Embryology, normal histology and gross anatomy should be in one department as found at the present time in the A-plus medical schools, such as Johns Hopkins, Harvard, and the Minnesota, Wisconsin, and the Iowa State Universities. If I am correctly informed this is true in veterinary schools only at the University of Pennsylvania, while we have at Ames, the gross and microscopic together with the embryology separate and given by the department of zoology. We believe that embryology should come early in the course. The view that embryology is merely a preparation for obstetrics is not based on the facts in the case. We can never understand the descent or failure of descent of the testicle or the position of the gubernaculum testis except through the facts of embryology; the importance of which has been fully emphasized by Prof. W. L. Williams' careful studies and papers.

Let me quote Flexner: "The earliest topics of the curriculum—anatomy, physiology, physiological chemistry—already hark back to a previous scientific discipline. Everyone of them involves already acquired knowledge and manipulative skill. They are laboratory sciences at the second, not the primary, stage. Consider, for example, anatomy, the simplest and the most fundamental of them all. It used to begin and end with dissection of the adult cadaver. It can neither begin nor end there today; for it must provide the basis upon which experimental physiology, pathology and bacteriology may intelligently be built. Mere dissection does not accomplish this. In addition to gross anatomy, the student must make out under the microscope the normal cellular structure of organ, muscle, nerve and blood vessel: he must grasp the whole process of structural development. Histology and embryology are thus essential aspects of anatomical study. No treatment of the subject including these is possible within the time limits of the

modern medical curriculum unless previous training in general biology has equipped the student with the necessary fundamental conceptions, knowledge and technical dexterity.”

We cannot learn tumors or much of the recent advance in pathology and experimental medicine, except by reference to embryology.

I confess that I must constantly use embryology to explain many facts in anatomy; for example, why the recurrent laryngeal nerves pass around the aorta and dorso-cervical arteries respectively, thus traversing the cervical region twice instead of going direct to larynx from the vagus in the carotid region. To learn the classification of glands we must understand how they develop. While a course of embryology given from a zoological standpoint is scientific, it should be presented from the medical view-point, especially the part dealing with histogenesis, which is usually left out, also more attention should be given to the placenta in gross dissections, and histologically, as well as actual dissections on various sized embryos, a thing usually left out entirely; the study of the placenta and embryo we have been doing with our comparative dissections.

We recognize six methods of approach in the teaching of anatomy:

1. Didactic
2. Quiz.
3. Specimen demonstration by instructor.
4. Specimen study by student.
5. Dissection.
6. The use of the living horse to amplify the others.

In our work in histology we use methods one to four inclusive and have made a serious attempt to prepare students for their work in physiology, pathology, surgery and medicine by including the following things not usually studied: 1. Histogenesis of the connective tissues and glands; 2. Joints, bursae, vaginal sheaths, a comparative study of morphology of the blood cells, the digestive organs and reproductive organs, the udder in various physiological states and last but not least the hoof and its corium. In fact you see that it is given from a veterinary view-point. This subject has not received its due share of time and effort in the past and even at the present in most schools; our greatest handicaps are lack of text and laboratory guides; our view-point and how we have met some of the problems follow:

Veterinary anatomy both gross and microscopic has to do with the normal structure of domesticated animals, i. e. the things the body is made of, the organs such as bones, joints, muscles, tendons, brain, nerves, stomach, intestines, lungs, heart, blood vessels, etc., following this and a part of it the detail of structure, what it is and how it is put together, kinds of cells and tissues in the body as a whole as well as their arrangement in particular organs. We need the aid of the microscope because we are unable to see the units with the unaided eye. We call the chemist and physicist to our aid cutting and staining the very thin sections so that we may have color contrasts to see the detail of the minute structures. While we are learning the morphology we also learn some of the fundamental things about the chemical constitution, reactions, and function of the different organs. Anatomy is the oldest and of necessity must be the first of the subjects studied in obtaining a medical education. We must learn about the thing itself before we can profitably study its activities, hence we need to know the structure of the organs or systems of organs before we study the normal functions in the detail of physiology. Again we must know the position, size, color and consistency (feel) of the normal organ to recognize the abnormal or pathological organ. *One cannot diagnose or treat either internal or surgical diseases without a constant use and reference to the detailed facts of anatomy.* To illustrate: Any one can lance an abscess, but only the one trained to feel the difference between the normal and abnormal can locate a deep abscess and drain it properly, to avoid injury to important blood vessels, nerves and adjacent fascial compartments. Again the internist uses anatomical facts to explain the entrance of micro-organisms at definite places, and whether held there or disseminated to other locations, e. g. tuberculosis, strangles, etc. While anatomy has the same value academically that any other science has, viewed from the professional standpoint it is not an end of itself but only the means to an end. It is the first or basis of the foundation subjects of medical science. It is almost platitudinous to state that the stability of the professional structure may be measured largely by the mastery of the fundamentals in this foundation. In addition to the facts learned the training and preparation for the following courses are no small part of the absolute benefits of a course in anatomy. These may be summarized as follows:

1. To learn the scheme of medical terminology.

2. To learn to visualize "retinize", i. e. not to see a bone as a bone but a structure with definite markings and parts such as shaft and extremities with depressions and prominences that are smooth or rough, deep or shallow, etc., to learn "to see" and not merely "to look at".
3. To learn "to feel" and transfer such mental impressions to words.
4. To learn expression: the language of anatomy comes as near that of mathematical precision as any one of the sciences.
5. Judgment to separate the essential from the non-essential, i. e. to conquer and remember the detail of one thing to the exclusion of a less important one.
6. The ability to make and retain original observations in the laboratory, to get knowledge from things rather than books.
7. As above noted to train the senses of sight and touch.

We may summarize the general objects of anatomy to be:

- a. To obtain the foundation facts of the structure of domestic animals.
- b. To train the student so that the subsequent subjects of the curriculum may be more comprehensible, and more easily mastered.
- c. To fit the student so that he may follow the future advancements in medicine.

Of the methods outlined below we were the first veterinary school to co-ordinate gross and microscopic anatomy, to use the living horse and prepared specimens consistently, in both class and laboratory work.

1. The use of the living subject in the class room and laboratory. In the latter the students are required to palpate all superficial structures and surgical landmarks and to outline all other structures. In this way the "feel" and relationships are learned on the living horse step by step, with the dissection. None of the scientific detail is lost but intensified, made useful, and extremely practical so that the student learns the structures of the living by studying both the living and dead and is not learning about the dead by the cadaver alone.

2. The emphasis of topography: While we take up our work in the beginning from the systemic plan, relationships are studied at the same time; to illustrate we find an oblique smooth groove

on posterior surface distal third of shaft of femur; at the time we take this up in osteology we learn that this groove lodges the femoral blood vessels. When we study the rhomboideus muscle we first study its origin, insertion, action, structure, then the relationships from without inward: anteriorly the skin superficial fascia, trapezius muscle; posteriorly the latissimus dorsi and scapular cartilage above the scapula proper; deeply the superficial layer of the dorso scapular ligament which appears superficially below the muscle anterior to the scapula, deeply the splenius, complexus and longissimus anteriorly, while posteriorly the serratus anticus and longissimus; the practical application of this may be seen in operations on cases of fistulous withers. In the class room and laboratory, sections cut in various planes are used to aid in getting clearer ideas of topography. In the latter part of the course of anatomy proper lectures on the topography of the important surgical regions are given. We believe it would be advisable to follow up this work with the senior classes in surgery by giving them lectures, quizzes demonstrations, on the topography of the various regions to be operated in the practicums; the living animals, sections, dissected specimens and cadavers should be used.

3. Co-ordination of gross and microscopic anatomy. This is impossible unless given in a single department so that two methods and view-points will not conflict. In our lectures and laboratory work and quizzes in histology, we constantly use gross specimens and see with the naked eye many things which we are studying microscopically; to illustrate we have gross preparations of the spleen, those showing the capsule and trabeculae only and others showing these spaces filled with the pulp. We hold our microscopic sections up to the window and compare with the gross specimen. While in the dissecting room, the spleen is studied grossly in free hand sections and slides reviewed microscopically, using both gross and microscopic notes as an aid. This is done in both the first and second dissections while in the quizzes over the viscera during the second year the gross anatomy is followed by the detail of histology in discussing the structure of the organ.

4. The constant use of prepared specimens in the class room and laboratory (see No. 6 above) to illustrate, students are dissecting the head, they will be furnished frontal, sagittal and horizontal sections of entire head, and sculptured ones of different aged animals to show teeth sinuses infra orbital and lacrymal canals, to

study and sketch at the same time, so they get the detail for example of the sinuses by chiseling them out and the relations both from their own specimen and by a study of the prepared sections, also further we are having a quiz on the nasal cavity. These same sections are used. *Thus our work is objective rather than didactic.*

5. Compressed air ought to be available in the dissecting rooms so that at times fascial compartments, vaginal sheaths, joints capsules and hollow viscera may be distended. The advisability of accurate knowledge of the position and extent of these structures is self evident from a surgical standpoint.

6. The every day use of the view-point that anatomy for professional purposes must prepare for present day demands of training in physiology, pathology, internal medicine and surgery. (Note the applications previously cited.)

Physiology should be taught by both class room and laboratory instruction; if time permits the lectures and quizzes should be supplemented by demonstrations. It seems unnecessary to say that laboratory work should begin with simple experiments, illustrating the fundamental, chemical and physical laws, as seen in the working of the animal body, then following up step by step to the point where complex experiments are used to show the interdependence of the functional activities of different organs, thus preparing the student to appreciate and understand the abnormal activity of individual organs, the result of this increased or decreased activity on other organs, and thus be prepared to analyze the symptom-complex of disease. The action of drugs and disease symptoms are now largely studied by physiologic methods. The student is thus prepared to analyze the charts and tracings now so commonly used in texts. If he does not have this laboratory training he is not able to understand his present or future problems.

The student should be referred to original sources for information in physiology for two reasons, first to get information from original sources and second to learn how we have obtained our knowledge of the animal body at work and to appreciate the experimental method.

We claim no particular originality for, and should hesitate to offer, the following laboratory outline if it were not for the discussion to follow:

1. Action of cilia by the "cork" experiment in the frog.

2. Simple reflexes on the "pithed" frog.
 - a. Simple pinching of toe.
 - b. Ditto after giving strychnine.
 - c. Ditto after cooling.
 - d. Spread of reflex by holding toe and applying acid to side.
3. Effect of section and stimulation of vagus on frog.
4. Actual test of the nerve for methods of stimulation.
5. Changes in normal and injured nerve as determined by electrometer.
6. After discharge in nerves.
7. Summation of stimuli.
8. Independent rhythm as shown by the scratch reflex; The same experiment also shows that movements are definite and purposive.
9. Fatigue in endings and synapse.
10. Refractive period.
11. Inco-ordination (cerebellar).
12. Equilibrium (semicircular canals).
13. Window study of rumination in the goat.
14. Effect of operative removal of the following: thyroid, adrenals, pancreas, liver, kidney, etc.
15. Demonstrations of Pavlov's classic, experimental studies of the digestive glands.
16. Osmosis and filtration in vitro, followed by the formation and absorption of lymph and chyle in vivo (see No. 21).
17. A study of muscle to show tonicity, power of contraction, extensibility, fatigue, etc.
18. Study of the circulation to show how the heart works, its controlling mechanism, and how this may be modified by other functions such as respiration, temperature, exercise, etc., or abnormal conditions such as injury.
19. Study of respiration.
20. The factors concerned in secretion such as nerve stimulation, amount of blood present, rate of blood flow. Inhibition through the nervous system or by other means, as shown in the classic experiments on the secretion of saliva, gastric juice, pancreatic juice and urine and sweat.
21. Demonstration of absorption: a—from the gut as shown by the feeding of fats and killing the animal to observe the

lacteals engorged, also by histological studies with Sudan III or other methods.

b—Absorption from tissue spaces as shown by pigment granules.

c—From such cavities as joints, bursae and vaginal sheaths.

It is understood that the foregoing experiments require apparatus and time. The student in doing the actual work must know in a general way what to expect as a result of his experiment; he must keep notes and study his graphic records; then later the instructor goes over the work in class, discussing it and pointing out the significance of the observations. The graphic charts so commonly used at present in all scientific work can be understood only in this way, by learning how they are made and what they mean.

In bacteriology the class and laboratory work should go hand in hand. The conclusions of the class room should be proven in the laboratory; the course should be such that it may be called applied bacteriology, keeping in mind the fact that we are training a veterinarian; allow me to digress at this point to say that the teacher of any subject must not only know the application of his subject but should have had a broad training in that subject and have come in contact with and worked under a master in that subject. Teachers need training as well as students. A professorship in the veterinary schools of this country should mean much more than it does at the present time.

The student should learn general bacteriology, what bacteria are, and how they grow, how to isolate and cultivate them. *No one can really appreciate aseptic precautions who has not mastered the technique of bacteriology.* Along with the physiology of bacteria the principles of immunity would be learned, since the reactions may be said to be interdependent. Along with or following the study of pathogenic organisms a thorough course in experimental serum therapy should be given; if either is to be neglected let it be the former. In practice or food inspection do we have to do with the cultural characteristics of an organism or the reactions it produces? A student ought to prove Koch's postulates at least once in his course. Parasitology should also be taught as far as possible by the laboratory method. More and more we must depend on the use of the microscope to aid in diagnosis. I never saw the mite of sheep scabies until in practice. Then I fell back on the B. A. I.

bulletin to help in the diagnosis made with the aid of a microscope. It was comparatively easy, but suppose I had tried to identify and classify some of the round worms in which only slight anatomical differences are present? I simply could not have done it, because I had had no training.

General and microscopic pathology are probably well taught, but is there enough attention paid to gross pathology, special and surgical or post mortem work? I fear the answer must be no. Again in practice and food inspection the gross pathology and post mortem are the pivots. I would not minimize the general and microscopic pathology or the morbid physiology. We must know them to understand disease and the symptoms of disease, also the microscopic lesions. But post mortems should be held in a careful and thorough manner. The student if he ever learns the technique of and how to interpret a post mortem must learn it by doing it under supervision. Also, it must be done often enough so that the method will become a habit; further, if he learns pathology he must study at the same time and co-ordinate the gross and microscopic lesions with the morbid physiology. The evolution of pathological lesions such as hepatization of the lungs, a caseated tubercle, etc., is an indispensable part of the instruction in pathology. A large specimen collection is a very valuable aid that should be available.

We all recognize that the final test of efficiency in medicine is the diagnosis. The clinical diagnosis has two heads: The one physical diagnosis in which we use the senses unaided. The other, the laboratory diagnosis, requires the aid of physical, chemical, physiologic, bacteriologic and pathological methods. *Here again the last analysis depends on the senses. We know that our senses become acute and expert only by use*, so that we may know that knowledge of pertinent facts, training in the use of these facts by certain orderly methods, and judgment in the interpretation of these facts, makes the diagnostician. If field experience alone made a diagnostician then we would have to take off our hats to the gray-haired quack with fifty years "experience in the business."

A few years ago a certain co-operative dairy association hired a manager and sent him to the city to contract their cream for a year. The manager was met by the buyer with this statement: "I have bought cream for 50 years". "What per cent cream do you want?" was asked by the manager. Answer, "100 per cent". Then the manager explained per cent in cream and submitted quo-

tations of various per cents. *The buyer chose the lowest per cent and paid one dollar a gallon for the milk added to the higher per cent of cream quoted.* This young man's training certainly counted more than the old fellow's experience.

Physical examination can only be learned by actually doing it. The method should be thoroughly learned before clinical work is begun and in the clinical work the method followed rigidly. *Slipshod methods of examination are probably more to blame for wrong diagnosis than lack of knowledge of the symptoms.*

Practice in examination of the blood, urine, feces, wound secretions and tumors from actual clinical cases should form a part of the clinical instruction. The student is supposed to know about these things from his previous studies. Now he should have training in actually examining and diagnosing his cases from these things.

General surgery and surgical diagnosis are really a combination of the former principles of bacteriology, pathology and diagnosis combined for the purpose of bringing sharply to the attention of the student and co-ordinating previous facts learned.

In pharmacology the student must learn the general principles of drug action, incompatibilities, advisable combinations, specific action and indications. Again the laboratory method is far superior. Physiologic apparatus should be used here to accurately measure the effects of drugs as well as direct observation on experimental animals.

I do not remember much of the didactic work I had on drugs, but I do remember vividly the action on subjects of strychnine, barium chloride, aconite, digitalis and a number of other drugs.

Probably in no other course given to veterinary students are we more at variance. Hobbies are rode threadbare only to be replaced by other useless ones ad infinitum.

In the course in laboratory pharmacy students should compound usable drugs, and become familiar with pharmaceutical technique.

In materia medica we should not give so much but give it better. A few standard drugs well used will be better than a pharmacopoeia undigested. It is not what we eat but what we digest and assimilate that counts.

I believe that therapeutics should represent a classification and the indications of drugs. Therapeutic measures should be given in

practice and surgery else the student will be burdened with useless material in duplication and conflict.

Sanitary science and governmental control work is not given a special heading as it may well be given with bacteriology and medicine. Likewise shoeing and soundness are classed with surgery.

SUMMARY AND CONCLUSIONS

1. The fundamental subjects should be taught from a veterinary standpoint.

2. The objective method is the best.

3. We must master the fundamental principles by learning the detail of the subjects covered.

4. The instructor's knowledge of a subject does not compensate for the students lack of it.

5. It is impossible to properly teach special surgery, medicine, etc., to students who do not know the fundamental facts and principles of the foundation subjects.

6. We err from a lack of knowledge rather than too much.

7. Our courses should be outlined and taught as given above if we are to keep pace with progress and get the public recognition due the profession.

8. There is a chance for needed improvements in all of our colleges in at least a part of the fundamentals. In other words our work should be readjusted so that all of the work may be balanced, each subject receiving its just share of time and material. Our courses are lopsided and no wheel is stronger than the weakest spoke. One particular line of work should not be developed at the expense of the others, neither can we dismiss a subject by saying that it is not practical, the burden of proof must rest with us.

9. More time and money must be spent in training the student than at present.

10. We must avail ourselves of the increased knowledge from all sources and present our special subject accordingly.

11. A summary of the years progress in each line should be presented for our uses in other lines. This offers a virgin field for English Journals.

12. Instructors must have a broad vision. They must be students and like Lincoln "count that day lost in which they have not learned some new thing."

When they get the idea and assume the attitude that they

know all that is useful in a subject, they cease to be useful instructors. The learner, the inquisitive genius is the best teacher. *He must radiate enthusiasm, and require something of his students else his instruction is a failure.*

HOG CHOLERA CONTROL

C. H. STANGE, Ames, Iowa.

A recent article appearing in the *Review* cannot pass without comment as it tends to convey a wrong impression in regard to conditions, especially so far as Iowa is concerned.

The situation instead of being "certainly serious" and our farms being "under stocked", is exactly the opposite. Perhaps the article was intended to apply to Minnesota, but as this is not stated and reference is made to the report from the State Biological Laboratory of Iowa, the writer wishes to state correctly the conditions in Iowa.

The "State-wide Campaign of Public Education" was started here three years ago and is now a common, every day feature in our work. Following is an extract from page 41 of the report referred to: "The educational work which has been of great value in the hog cholera work in this state was carried on by four veterinarians. The farmers have been informed concerning the significance of hog cholera, how it may be recognized, prevented, controlled and how the serum should be and should not be applied." "The total number of people present at lectures and demonstrations was 20,379."

No plan is being offered as a possible solution. Too many have already been offered as theories but Iowa is interested in those that have been thoroughly tried out. A plan has been followed in this state for two and a half years, and it is only after having followed it for that length of time in a state having at present about ten million hogs that I venture to say something concerning the results.

In 1913 or the year the work (outside of educational) on hog cholera was started in Iowa, a census showed a loss of 2,709,876 head of hogs worth approximately \$27,098,760, which is considerably more than all of the hogs Minnesota is reported as having. During 1914 reports in this office show that over 70,000,000 cubic

centimeters of serum were used on Iowa farms and about 85%–90% of it was used in connection with virus (simultaneous) and we have not asked others to carry the “weight of responsibility.” The result was that the losses during 1914 were reduced from twenty-seven to about six millions of dollars. It would seem according to a number who are still debating what to do while the economic losses in their states remain about the same, that as a result of the distribution of about 1,750 quarts of virus (according to Dr. Reynolds’ estimate) during 1914 that this year would experience an enormous increase in the prevalence of the disease. As a matter of fact there is a large decrease and the state has more hogs than it has had for several years, and only isolated outbreaks of cholera are reported,—a rather satisfactory condition even though, “the thing has been simply running wild.”

The plan which has been followed in Iowa will probably prevail until some other system which has been tried and been shown to give better results under existing conditions is developed, in brief, is as follows: A State Biological Laboratory was established with a director. A standard of potency for hog cholera serum to be used in the state was established. Before the distribution or sale of serum in the state can be started, the distributor must file a bond of \$1,000 as a guarantee that his product will meet the standard of potency and secure a permit which may be revoked for cause. No person is permitted to use virus without receiving satisfactory special instructions and a permit. No distributor is permitted to deliver virus to others than permit holders. Virus permits may be cancelled for cause. Any serum or virus in the state deemed unsafe may be destroyed. The state now maintains such inspection as it deems desirable in serum plants and distributing agencies. All shipments of serum and virus and their destination must be reported.

Outbreaks of cholera in serum alone treated herds are many times more numerous and much more objectionable than “vaccination cholera.” In some states where virus distribution is prohibited in sealed bottles under regulation the unstoppered bottle (sick hog) is conveyed along the highway and placed in the herd to insure exposure and permanent immunity.

The problem facing Iowa was to prevent a great economic loss each year. This problem required action and not words, it necessitated a fair estimate of what the farmer will and will not do,

what facilities were available and could be used. Hogs were dying to the value of over half a million dollars a week. Sanitation and newspaper advice had been available for a great many years. The serum (and virus) treatment was new to most farmers. Instead of pinning faith to one method we brought into activity every factor that could be used to advantage under the circumstances. The following figures are sufficient to indicate whether Iowa is succeeding under the present system:

	Per cent*	Jan. 1, 1915 Number of Hogs	Jan. 1, 1914 Number of Hogs
Iowa.....	125%	8,720,000	6,976,000
Minnesota.....	120%	1,716,000	1,430,000
Missouri.....	100%	4,250,000	4,250,000

	Value of Hogs	Jan. 1, 1915.	Jan. 1, 1914
Iowa.....	\$95,920,000		\$87,898,000
Minnesota.....	21,450,000		20,020,000
Missouri.....	34,425,000		36,125,000

The sanitary measures recommended by many are to be commended but *this alone will never prevent the great losses which Iowa experienced before serum came into general use.* "A more comprehensive plan is needed," because while such a plan of thorough disinfection and cleaning up may be theoretically ideal, it does not consider the farmers who will not work in with the plan and who can easily bring to naught the good work done on other farms. Indiscriminate simultaneous vaccination is not recommended and is not practiced generally in this state regardless of whether the the herd is sick or exposed. This is shown by the light demand for serum and virus this year. On the other hand, we think the greatest care should be used in the distribution and use of virus as it may easily become the means of establishing sources of infection. The great difficulty has been that too many have not differentiated between the prevention of great losses and hog cholera eradication. One is a problem at the time of extensive prevalence, the other when the number of outbreaks are at their lowest.

Some of the statements contained in the Minnesota plan are difficult to understand, viz., "the fundamental difficulty is not a too free distribution of hog cholera virus; is not a lack of permits

* As compared with January, 1914. Up to this time, 1915 has shown a great decrease over 1914 in number of outbreaks.

or too many permits for the use of virus. There has been a large and unnecessary spread of hog cholera virus, both natural virus and serum plant virus." "More than one veterinary sanitarian has expressed the wish that the serum-virus treatment has never been developed. In most states where virus has been used at all the thing has been running simply wild." "It seems to have been settled that given a successful official control, serum-virus is a proper procedure for healthy herds in infected territory, etc."

"Serum would be shipped express C. O. D. to the owner, bill covering both serum and administration. Virus would go to the veterinarian who is to administer the treatment." "A veterinarian doing work under this plan would have no money transactions with the owner." "In connection with this plan we would provide for local storage of serum in each infected county."

"There must be assurance of fair treatment for all state serum permit holders. Any veterinarian, for example, holding such permit must have the privilege of coming to the storage agent and getting a fair share of available serum at any time." "We would reserve the right to make direct shipments to either veterinarian or owner in accordance with our regular conditions provided for this work."

The campaign against hog cholera in Iowa has been sufficient to demonstrate that vaccination must be one of the chief factors in preventing great economic losses from hog cholera; that temporary immunity is not satisfactory to the large majority of farmers; that virus will be used with serum more safely when under reasonable control than if we attempt to prohibit its use entirely; that Iowa had on January 1, 1915, a greater per cent of increase in hogs than any of the surrounding states; that a state should have one policy and continue without frequent changes, as anything else causes confusion, delay and heavy losses; that every factor which can be used successfully should be employed; that the first and most essential thing is to prevent heavy losses and that eradication necessitates organization and education over a long period of years; and finally, that it is folly to adopt new plans until they are known to excel the old.

A REVIEW OF RECENT PROGRESS IN HOG CHOLERA INVESTIGATIONS*

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Hog cholera investigations can be divided into two groups, namely, those of the laboratory and those of the field. These two groups naturally overlap each other, more or less, in all directions. In some instances it would be impossible to carry on certain laboratory investigations entirely independent of field studies, while the reverse is also true, but to a more limited extent.

At the present time the most important field investigations that are being carried on are those of the Federal Bureau of Animal Industry, started about two years ago, and being kept under way at the present time on a large scale, by an appropriation of \$500,000 made by Congress and approved by the President under date of February 23, 1914.

According to a report¹ made by Dr. Dorset at the eighteenth annual meeting of the United States Live Stock Sanitary Association, held in Chicago, February 16-18, 1915, the work of the Bureau is divided into three major projects, as follows:

“Project A.—A definite area (one county) has been selected in each of fifteen states. Observations relative to the control or eradication of hog cholera are being made in each of these areas. The Department of Agriculture places, generally, three qualified veterinary inspectors in each area and furnishes the serum required for its work. The states are expected to co-operate by carrying on the needed educational work and survey the county, and by enforcing the necessary quarantine and sanitary regulations.

“Project B.—This project consists in the supervision of all establishments which conduct an interstate business in hog cholera serum and virus, and the work is intended to protect veterinarians and farmers against the use of worthless or dangerous serums and viruses. The work under this project is carried out entirely by the Department of Agriculture and consists in the inspection of serum and virus plants, the issuance of licenses to qualified establishments, the supervision of serum production in licensed establishments, the examination and testing of samples of serum and

* Read at the Minnesota State Veterinary Medical Association, St. Cloud, Minn.

virus, and the collection of evidence bearing upon violations of the law under which this project is established.

“Project C.—This consists of demonstrational and educational work among farmers, in co-operation with the state colleges. The idea pursued in this work is to organize clubs for educational, demonstrational, and other work in the prevention of hog cholera; and to work with county advisers and farm demonstrators to promote educational and propaganda work concerning methods of preventing hog cholera through sanitary and quarantine measures and the use of serum. The fundamental idea of this last project is to demonstrate to farmers how they may, by their own efforts, reduce losses from hog cholera.

“The work of the Bureau of Animal Industry may thus be said to consist: first, of educational work as a basis for its other activities; second, of control work to prevent the interstate shipment of contaminated serums and viruses; third, of experimental work in selected areas to determine the most effective and practicable means for reducing losses from hog cholera, and of finally eradicating this disease, if possible; and lastly, of laboratory researches on subjects concerning the etiology and prevention of hog cholera.”

It should be borne in mind that these county experiments are not intended to demonstrate how to eradicate or control hog cholera, but, according to Dr. Dorset, they are rather a series of experiments on a large scale, by which it is hoped to ascertain the best and most practicable methods for the control of hog cholera.

Different plans of procedure have been adopted in the different counties. Healthy but exposed herds have been treated, some with the single and some with the double method. In infected herds hogs showing slight symptoms are usually given the single treatment, but the apparently well hogs are given either the single or the double treatment, according to the plan being followed in that particular county.

Not wishing to tire you with a lot of figures, I will give only a brief summary of the conclusions arrived at by Dr. Dorset, based on the data gathered and supplied by the inspectors in charge of the work in the different counties.

Dr. Dorset draws no conclusions as to which is the best method of controlling hog cholera, stating that this question is of such vast importance and that the problem is of such immense difficulty that

careful preliminary work on a large scale must be carried on before recommending any kind of a nation-wide campaign.

Observations were made on the effect of the double treatment administered to pregnant sows, and Dr. Dorset considers that the figures indicate that the double treatment does not produce abortion in pregnant sows. Almost 1500 pregnant sows were treated under all conditions, with abortions in less than 12%, most of these taking place in infected herds, the sows being given the single treatment. The inference is drawn that the sows that aborted were really in the first stages of the disease, and the abortions were due either to this fact, or resulted from rough handling of the sows at the time of treatment.

Mention should be made of the figures gathered by Dr. Fischer² in Ohio, illustrating the same point. Fischer reports that less than 9% of the sows given the double treatment subsequently aborted, and that this rate is probably not higher than might be expected under ordinary conditions where no treatment whatever is applied.

At the State Serum Plant we have been able to make a number of observations along this line. It is rather the exception than the rule to have sows abort following the administration of the double treatment. We get quite a number of young sows from the stock yards, when we buy our pigs for virus purposes. If these young sows go over one hundred pounds we usually double-treat them, rather than inoculate them for virus purposes. These sows rarely abort, if they are pregnant, as many of them prove to be.

It sometimes happens that a pregnant sow is inadvertently hyperimmunized, for serum production, and either before being bled or during the bleeding process she is noticed to be pregnant. Such sows have frequently received from 1000 to 1500 c. c. of virus, without producing an abortion. Even the somewhat rough handling these sows receive, incident to placing them in the crates for hyperimmunizing or tail bleeding, has failed to produce an abortion.

Young sows not suspected of being pregnant have frequently been used for virus production. During the course of the disease, or at autopsy, their condition is discovered. Once in a while such young sows abort, but usually they do not. It has been observed that very frequently the condition of pregnancy seems to increase their resistance against the hog cholera virus. They show considerably less of a temperature reaction than the other pigs in the same group, and these sows are usually the last to succumb. We have

tested the serum drawn from a number of sows while in a pregnant condition, and have found it to be potent, according to the Government test.

Continuing with the work of the Bureau, Dr. Dorset has compiled figures on the effect of the double treatment on sterility. Observations were made on over 200 sows, treated and untreated. Of the treated sows 5.6% appeared to be sterile, and of the untreated sows 6.7% appeared to be non-breeders. Dr. Dorset naturally draws the conclusion that the double treatment, when properly administered, does not produce sterility in sows.

Perhaps the one great objection to the use of the single treatment that we most frequently hear is its failure to permanently protect, and the consequent reinfections in herds treated with serum alone. To see just how great an objection this was under practical conditions, observations were made on this point. In 1605 herds that were treated by the single method exclusively, recrudescences occurred in about 51½%. The results in Renville County, this state, were even better than this, there being only about 4% of reinfections. Not a single drop of virus has been used by the Government veterinarians in the county, since the work was started over a year ago. Virus has been replaced by disinfectants in the attempts to keep down the number of recrudescences.

To the laboratory investigator, the most important lines of work, in connection with hog cholera, at the present time are:

1. The isolation and artificial cultivation of the causative organism, with satisfactory proofs of its etiological relationship to the disease.

2. The perfection of an attenuated virus or a true vaccine, for preventive inoculation, to take the place of the dangerous, expensive and cumbersome double method.

3. The standardization of hog cholera serum, especially a method that is more accurate and less time-consuming than the only method in use at the present time.

4. A method for the quick and accurate making of laboratory diagnoses of hog cholera.

Before going further with this paper the author will take occasion to say a word concerning the publication of results of experimental and research work. There are two tendencies that are generally noticeable, namely, the tendency to publish results prematurely, and the opposite tendency to withhold valuable material

from publication. In the former case we refer to poorly drawn conclusions usually based on insufficient work, and published for the sake of obtaining priority. In the other case reference is made to negative results often obtained by investigators, or work conducted by them, which, through modesty, they do not think worth while publishing. In many instances much duplication of effort could and would be avoided if access could be had to these results.

Most of the laboratory research and experimental work on hog cholera that is being done at the present time, is being conducted in the veterinary departments of our agricultural experiment stations, in many cases in connection with the state serum plants. This is true of such states as California, Kansas, Kentucky, Indiana, Minnesota, Missouri, North Dakota, Oklahoma and a few others. In some states this work is carried on by the state live stock sanitary board, as in Ohio and Pennsylvania. Considerable research work is being done in the scientific laboratories connected with our larger commercial producers of biological products.

One of the questions receiving considerable attention at this time is the isolation and cultivation of the specific causative organism of hog cholera. The value of a convenient and economical method for the artificial cultivation of the hog cholera virus can hardly be estimated. Numerous investigators have reported having seen all sorts of things in the blood of hogs infected with cholera. The work that has attracted most attention in this country has been done by Dinwiddie, of the Arkansas Agricultural Experiment Station, and by King and his associates in the Parke, Davis and Co. Research Laboratories.

Dinwiddie first reported his findings in a paper³ read before the American Veterinary Medical Association, at Indianapolis, several years ago. His work has subsequently been published in bulletins^{4, 5} of the Arkansas Station. Dinwiddie's organisms are intracorpuseular bodies, associated with the erythrocytes, while King's⁶ organism is a spirochete. The latter is said to be relatively large, measuring five to seven microns long and one micron in width, being flexible, round and blunt at its ends, actively motile, and revolving around its longitudinal axis. King claims that this spirochete can be readily distinguished from bacteria on account of its lack of rigidity and its characteristic motility, which is described as being undulating, with the spirals fixed. It can be differentiated from blood films by its refractive properties and its characteristic morphology.

King, Baeslack and Hoffmann⁷ report the examination of the blood of forty-eight normal hogs without finding any spirochetes, whereas the examination of the blood of forty hogs suffering with cholera, all revealed the presence of a spirochete. In the case of six hogs which recovered from the disease, spirochetes were found during the course of the disease, but were absent after recovery. The sick hogs referred to were infected with twelve different strains of virus.

Laboratory diagnoses of cholera were made in two instances by means of dark field examinations of blood revealing spirochetes. In other instances these were found a few hours before any symptoms appeared. Spirochetes were found with less difficulty in the blood of hogs suffering from the acute form of the disease. Spirochetes are easily demonstrated in the scrapings from the intestinal ulcers of hogs dead from cholera. The organism was also found in the crypts of the cecum and in skin lesions. Attempts to isolate the spirochetes from the spleen, liver, lymph-nodes, spinal cord, cerebro-spinal fluid, bile and urine were reported as having been unsuccessful.⁸

Hayes,⁹ of California, has examined twelve specimens of blood from cholera hogs and reported that he was unable to find spirochetes present in any of them.

According to the latest report of the Chief of the Bureau of Animal Industry (1914)¹⁰ the Biochemic Division has made some observations on the presence of spirochetes in hogs. These studies have shown spirochetes to be present in considerable numbers in the contents of the intestines, especially in and around the ulcers found in the intestines of sick hogs. Spirochetes could not be demonstrated in the blood, but large numbers of the same spirochete were found in the intestinal contents of healthy hogs. Based on these findings, the conclusion is drawn that King's spirochete is an intestinal saprophyte of the hog, and in no way connected with cholera. It may enter the blood with other secondary infections.

King holds to the belief that his spirochete is capable of breaking up into granules and that these granules may play an important part in the life cycle and physiological functions of the organism. They are present in the blood of cholera hogs, in cultures of *Spirochaeta suis*, and are capable of producing the disease in healthy hogs. Granules were not found in the blood of normal hogs, both susceptible and naturally immune.

These granules are undoubtedly the same as those referred to in annual reports of the Veterinary Division of the Indiana Experiment Station. Craig and Whiting¹¹ refer to them as irregular, round bodies or granules, similar to the forms seen in normal blood and known as hemoconia or blood dust. The same investigators also report having seen filaments in the blood, free and attached to the margins of the blood cells, in both healthy and diseased hogs, but more numerous in the latter. In an earlier report¹² the statement was made that these two forms of organisms undoubtedly bear a close relation to hog cholera, but proof of the fact that they are the direct cause of the disease has not yet been secured, because of the fact that it has thus far been impossible to isolate them. In a later report,¹³ referring to the filaments, they state that they are to be considered as a clinical phenomenon, the result of disintegration of the erythrocytes. The same report states that the so-called granular bodies show a tendency to increase in number when placed in artificial culture media. The nature of the media used is mentioned in the latest report available¹⁴ and they consisted of milk, hay and meat infusions and bouillon, and various sugar media. More than 60 germ-free filtrates were studied with the aid of a Zeiss ultra-microscope.

In summarizing their work, King and Hoffman¹⁵ claim to have practically fulfilled Koch's laws, in so far as it is possible with an organism possessing the biological characteristics of the spirochetes, and that it may logically be concluded that *Spirochaeta suis* is more established as the specific cause of hog cholera than any other known organism.

King and Drake¹⁶ have suggested the possibility that, at some time or period in its life cycle, *Spirochaeta suis* is capable of passing through bacteria-proof filters.

In this connection it might be well to call attention to the work of Von Betegh.¹⁷ This investigator claims that the ultra filtration of the filterable virus of hog cholera is questionable. He states that the virus, in the form of the heart's blood, emulsions of spleen, kidney and lung tissue, after being filtered through a Bechhold disc collodion filter, did not produce hog cholera when injected into young pigs. He believes that the viruses that we usually call filterable are not filterable at all, and that their filterability depends entirely on the filter used. The unfiltered virus contained strongly refracting bodies and organisms resembling spirochetes,

and when cultivated on agar, showed colon bacilli, bipolar organisms, and others resembling *Bacillus suispestifer*.

In their latest publication, King and Drake¹⁸ announce that a pure culture of *Spirochaeta hyos* (formerly *Spirochaeta suis*) has been secured and that typical hog cholera of the acute type has been produced by inoculating a hog with this culture.

Two German investigators¹⁹ recently startled the scientific world with the announcement that they had isolated and cultivated the causative organism of hog cholera, but this work was not reported in detail, and the methods of isolation and cultivation were not given.

Arnheim²⁰ has criticised the findings of King and his co-workers on the ground that up to this time spirochetes have not been filtered under pressure, and furthermore that salvarsan, a well-known spirochete poison, is not of any value in hog cholera. This investigator was able to demonstrate spirochetes in the blood taken from the tails of infected hogs, but was unable to find them in the heart's blood. He was able to find them in the intestinal tract. He believed that the spirochetes found in hog cholera originate from the intestines.

Uhlenhuth²¹ has made a study of the effects of various disinfectants upon the hog cholera virus. He found that corrosive sublimate and carbolic acid would not kill the virus in a comparatively short time. A six per cent cresol soap solution and calcium hydrochloride in varying dilutions destroyed it within one hour. The virus is very resistant to cold, (as we know by experience in Minnesota) but it is killed by drying at a temperature of 78°C. Heatings for one-half hour at 58°C. do not rob it of its disease producing powers. Virus inclosed in fermenting manure is killed. It was also found that hogs which have apparently recovered from hog cholera, but for some reason are in an unthrifty condition, frequently prove to be virus carriers. The secretions from the eyes and nose disseminate the virus.

Several laboratories have made observations on the bacterial contamination of hog cholera serum. Hayes,²² in California, concludes that practically all anti-hog cholera sera contain living bacteria. A species of streptococci predominated in all sera he examined. He found that hyperimmune hogs do not give off bacteria in their blood, and that the greatest opportunity for organisms to gain entrance to serum is during the process of defibrinating and

bottling. Organisms multiply in serum preserved with one-half of one percent of phenol. Hayes believes that a high bacterial count does not necessarily predispose to abscess formation.

The Indiana Experiment Station¹⁴ reports the purchase of samples of different commercial sera and the tests of these, both for purity and potency. Bacterial counts in the different makes of sera varied from 30,000 to 125,000,000 bacteria per cubic centimeter.

The Kentucky Experiment Station²² has also made some bacterial examinations of serum. Dr. Graham reports in this connection that some sera which they produced contained no bacteria, while others contained as high as 65,000 per c. c. No relation could be observed between the bacterial content and potency. Serum that showed the presence of secondary bacteria proved just as potent as sterile serum. He recommends the determination of secondary bacteria in serum as a requirement in routine serum production, the samples for bacteriological examination to be taken from the mixing tank at the same time that a sample is taken to determine the potency.

Something that is very desirable is a method of standardizing hog cholera serum. This problem has been attacked in two directions by different groups of workers. Reichel²³ had the problem in mind from the virus side, believing that if we had a fixed virus of hog cholera, as we have for rabies, it would be easier to produce a standard serum. In a recent publication the author²⁴ questioned the feasibility of this, for several reasons. The great variations in immunity and susceptibility of different hogs toward the hog cholera virus makes the problem a difficult one. The secondary infections met with in hog cholera, not present in rabies, tend to complicate matters and make the problem harder. However, if it is possible to get a fixed hog cholera virus, I believe we have it at University Farm at the present time. The virus which we are now using at the State Serum Plant is now going through its 120th passage, and appears to be as virulent as it is possible to get it.

Haslam and Franklin²⁵ have endeavored to standardize serum in the finished product. Their methods involve the use of test pigs and the index of the potency of the serum under the test is gauged by the reaction shown by the test pigs. In any test where pigs are used, great variations in natural immunity must be taken into consideration, these extremes varying from what appears to be a perfect natural immunity up to extreme susceptibility.

Haslam²⁶ has made one of the most sensible suggestions that we have heard of for some time. Briefly it is to test serum in large quantities, using a correspondingly large number of test pigs, on the assumption that the exactness of the test varies with the number of test animals, the greater the number of these the greater the accuracy of the test. Haslam suggests testing serum in quantities of 500,000 c. c. at a time. This is from three to six times as large a quantity as is usually tested at one time, but by using from three to six times the usual number of test pigs, the expense is no greater and a very much better idea of the potency of the serum can be obtained.

What appears to be an encouraging piece of work is that reported by Dr. John Reichel,²⁷ of Mulford's scientific staff. He has refined or concentrated hog cholera serum by a rather complicated process of precipitations and filtrations into one-half, and even less, of its original volume. The anti-bodies in the serum appear to be associated with the globulins, as shown by Reichel in his work, and also some work done in the Biochemie Division of the Bureau of Animal Industry, under the direction of Dr. Dorset.¹⁰ Reichel's refined serum is sterile and free of a large portion of the inert substances of hog cholera serum as we are accustomed to use it. In a recent communication, Dr. Reichel informed me that plans were under way to place hog cholera serum globulin on the market, but that a great deal of work on it remained to be done, indicating that there were several difficulties to be overcome before it would be possible to market it in competition with serum.

None of the investigators who have claimed to have cultivated the hog cholera organism, have reported any attempts to attenuate their organisms, with a view to perfecting a vaccine. Apparently the only work that has been done along this line is the continuation of the experiments to prepare a vaccine by heating virus to different temperatures for varying periods of time. Graham and Brueckner²⁸ have published their results and conclude that virus heated at 60°C. for one hour may produce cholera, and pigs inoculated with such a virus, even if they do not develop cholera, are not necessarily rendered immune. The same dose of vaccine may kill, protect, or non-protect inoculated animals of the same size under similar conditions. For these reasons they believe that attenuated virus is worthless in rendering swine immune to cholera.

This is rather in direct contrast to the favorable results re-

ported by Peters²⁹ several years ago. Craig reports some work done along similar lines at the Indiana Experiment Station.¹⁴ A mixture of one part virus and two parts normal salt solution was incubated at a temperature of 37.5°C. for 24 hours. Then this mixture was heated from one to two hours at temperatures varying from 60 to 65°C. Of 62 pigs inoculated with the heated virus, 60 died of acute cholera. Of 23 pen exposure checks, 21 died of cholera.

Lewis, Shuler, McElroy and Ritter,³⁰ of the Oklahoma Experiment Station, have attempted to prepare a vaccine by passing virus through the bodies of immune hogs. The work was done first with a view to determining how long the virus injected for the purpose of hyperimmunizing remained virulent. Blood drawn from a hog as early as 24 hours after hyperimmunization and used as a vaccine, apparently protected four pigs, but the value of the experiment is lost, owing to the fact that no control pigs were kept, or at least reported.

About two years ago a hyperimmune was bled, by mistake, on the fourth day after hyperimmunization, at the State Serum Plant. The error was detected before the blood was mixed, and accordingly was kept separately. The question arose as to whether it contained any virus, or sufficient antibodies to be used as a protective serum. Four pigs, weighing from 15 to 25 pounds, were inoculated with varying amounts of the vaccine(?). One pig that received one cubic centimeter died of cholera on the 23rd day. The second pig developed chronic cholera and died on the 40th day. The third pig passed through an attack of cholera and recovered. The fourth pig, although it received 15 cubic centimeters, likewise passed through a mild attack of cholera and recovered. Both of the latter pigs were badly stunted, and never were thrifty again, having been kept under our observation over six months. This work was taken up again recently, but apparently the results are extremely variable, so much so that I would prefer not to say much about them at this time.

With the exception of the work of King, Baeslack and Hoffmann,⁷ already referred to, the problem of diagnosing hog cholera in the laboratory has received comparatively little attention. A number of investigators have from time to time thought of the possibilities of the complement fixation test as being of assistance in this respect. The chief difficulty seems to lie in securing a suitable antigen. At the Missouri Experiment Station, Connaway and

Durant³¹ have been doing some work along this line. In their preliminary report they state that they used, as antigens, blood and extracts of spleens of virus pigs. Apparently they obtained rather irregular results.

The only other work of a similar nature reported has been done by Healy and Smith³² of the Kentucky Experiment Station. They used an extract of the mesenteric lymph-nodes and state that this antigen shows striking differences in its reactions toward sera from normal hogs, rabbits, cows and hyperimmune hogs. They state further that the antigen is not present in the freshly prepared gland extract, but requires a definite period (eight days in most cases) for development; the antigen passes through an ordinary porcelain filter, but not through an "F" bougie.

Along the line of laboratory diagnosis the Pathological Division of the Bureau of Animal Industry has done some work of a histological nature, in an attempt to differentiate between cases of hog cholera and glomerular nephritis, in both of which conditions the kidneys very frequently present petechial hemorrhages. In the last report¹⁰ of the Bureau, it is claimed that these two conditions can be differentiated under the microscope very readily, and the conclusion is drawn that the presence of hemorrhagic kidneys alone was not sufficient for a diagnosis of cholera. We have noted this hemorrhagic condition of the kidneys in young pigs suffering from necrobacillosis, and it undoubtedly has been the reason for a number of mistaken diagnoses and as many unsatisfactory experiences with serum.

In closing I wish to mention one other experiment, conducted by Birch,³³ of the Cornell Veterinary Experiment Station. He has fairly well demonstrated that under our present meat inspection regulations it is possible for the carcasses of hogs harboring the virus of hog cholera to be passed for food. This was demonstrated by feeding to susceptible hogs pieces of pork from pigs inoculated with virus, and killed before the appearance of macroscopic lesions. These pork scraps were fed fresh, refrigerated and cured. It is readily realized how cholera may be spread by feeding uncooked pork scraps to hogs. Thousands of hogs in this country are fed on garbage, and although a great majority are probably kept immunized against cholera all the time, those in uninfected territory may not be. Here lies the danger, namely, that the disease may be spread by these infected pork scraps, into previously uninfected

territory. Canada, in a way, rather blames a great deal of her cholera on this source of infection, according to Rutherford³⁴ and McGilvray.³⁵ The Pathological Division of the Bureau, in their most recent report,¹⁰ refutes this claim, at least in so far as brine-pickled and dry-salted pork is concerned. Portions of bacon from hogs in different stages of cholera were brine-pickled and dry-salted, and then fed to susceptible hogs without producing the disease. The same hogs were subsequently shown to be susceptible to cholera by inoculations with virulent blood.

A review of these hog cholera investigations has been made at this particular time because we believe that the time is not far distant when the Experiment Station will be able to devote considerable time to research and experimental work along similar lines. With increased facilities and more help for serum production, as well as additional space and equipment for experimental work, I feel safe in saying that we will be deeply engaged in this kind of work before this year is out, and that serum production will be subsidiary to research work.

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URINARY LITHIASIS IN BOVINES*

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In dealing with this subject it is not our aim to go into technical or theoretical points, but to deal with it solely from the practitioner's point of view.

Since literature on this subject is very brief, therefore we shall confine ourselves mostly to our observations.

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The ox is a very peculiar quadruped, presenting but few characteristics in common with the horse or other domesticated animals, and therefore, is prone to manifest in a different way the symptoms of the disease which he and the horse may have in common.

ETIOLOGY. The exact cause of urinary calculi is not yet fully understood; yet we can all agree that the ox is often afflicted with these lime deposits and I believe from his peculiar diathesis that he is more subject to this affection than most other ruminating animals unless it be the sheep.

Why some cattle possess calculi and others not, with identically the same food and water, is beyond my knowledge. My belief, however, is that it comes from some derangement in the function of the kidneys or other perverted chemism.

Most writers claim that the trouble arises from the kind of food they eat or from the water they drink. If this be the case why do not cattle given an abundance of wheat bran, clover, hay, sugar beets, and lime stone water oftener become affected than those on a succulent nitrogenous diet?

My observation for the past twenty years fails to verify the opinion that any special kind of food or water have any material effects in producing calculi. (See postmortem No. 2).

The more thrifty and plethoric animals seem to be oftener affected, and those on forced or full feed much oftener than those that are thin and on scant rations.

Observations have further shown that sheep on forced feed are much more prone to these lime deposits than those that are not heavily fed.

Therefore, my conclusions are that the chief cause seems to be from excessive feeding in a majority of the cases; and that the drinking water, temperament and hereditary predisposition are but small factors.

CLASSIFICATION OF URINARY CALCULI. The classification is most conveniently made according to the location in which they are found.

1st, Renal calculi found in the kidney which may again be subdivided into

(a) Calculi of uriniferous tubes.

(b) Calculi of the pelvis of kidney.

2nd. Uretral calculi found in the ureters.

3rd. Vesical calculi found in the bladder.

4th. Urethral calculi found in any place in the urethra.

5th. Preputial calculi found within the sheath.

Calculi may also be subdivided according to their chemical composition, but this would afford no guide to their location or symptoms, as calculi of the same chemical composition may be found in any part of the urinary tract from the kidneys to the sheath.

It is my belief, which is further substantiated by postmortem, that the formation of *most*, if not *all* urinary calculi in cattle, begin or originate in the kidneys and that they pass from there on to the different locations in which we find them.

I can not accede to the belief that these urinary calculi have a nucleus of some foreign body around which these salts have been deposited, neither do we find those concentric rings representing the layers that have deposited in succession as in lactiferous salivary calculi and bezoars.

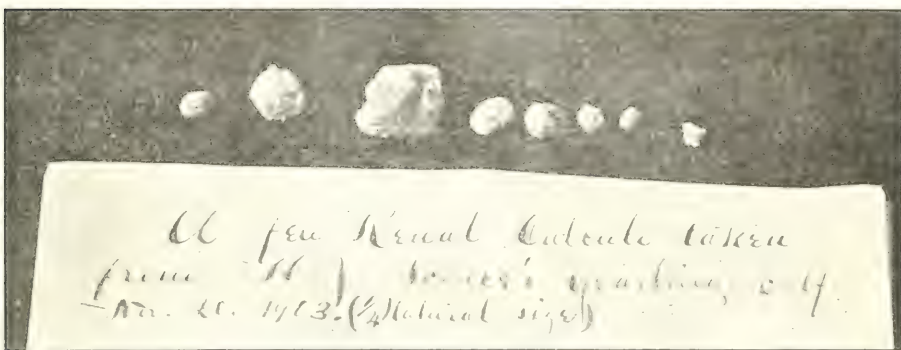


FIG. 1.

The form or shape of these calculi will vary according to location in which we find them. This is more especially true if they have remained in the same location or position for any length of time.

In the kidneys they are usually of a spherical outline and small, and the adhering of several of these smaller ones constitute those larger ones whose sides are rough, resembling a mulberry surface.

Again they may present smooth or polished surfaces as when found in the bladder and no doubt these cystic calculi become polished by remaining in contact with other calculi in the bladder for some time.

Urethral calculi may present either a smooth or roughened surface and if a *roughened* surface, we conclude that it has either come directly from the kidneys, or that there are but few if any more remaining in the bladder.

If we remove one from the urethra that has a *smooth* or polished surface we conclude that there are *many* calculi yet remaining behind to give us trouble.

SYMPTOMS. As a rule there are no premonitory symptoms of *any* disturbance until a calculus passes into the urethra. Post-mortem case number two, which is given here is the only one in my experience that ever showed any symptom of calculi previous to the blocking of the urethra with a calculus.

In order to obtain a better understanding, we shall divide the symptoms into two classes.

1st. Those shown by partial occlusion of the urethra.

2nd. Those indicating the complete blocking of the urethra.

In partial occlusion but little if any physical disturbance is noticed but later on we see what resembles a large fluctuating abscess on the median line in front of the scrotum, but seldom behind it.

This fluctuating mass may extend to either side from the line of the penis and extend over considerable of the inferior surface of the abdomen.

In other and still more protracted cases of partial occlusion we see a fistula on the median line between the sheath and scrotum of both the urethra and the skin, and the urine escaping here during micturition.

These cases are the result of partial occlusion of the urethra by a calculus, enough water escaping all the time to prevent death, but the entangled calculi causing a fistula of the urethra and other coverings.

It is not uncommon to be called to see other neglected cases to find no evidence of pain, and the only symptoms would be that the animal was apparently bloated, sluggish, not eating, and breath slightly impregnated with uriniferous odor.

On palpation of the rumen in these cases we fail to find any symptoms of gastric tympany, but might conclude it was a case of ascites until given further examination. Upon physical examination of the bladder per rectum it is often possible to find it full, tense, and yet the abdominal cavity contains many gallons of urine. In many cases of this kind postmortem reveals no rupture of the

bladder, but a weak, degenerated condition of the walls of the bladder and ureters, thereby allowing the urine to escape by a process of osmosis. No treatment is available in these cases. In *complete* blocking of the urethra pain is exhibited from the first, by dullness, refusing feed, then shifting of hind limbs, colicky pains, twisting of tail, then alternately raising and lowering of tail as in the act of micturating, the alternate contracting and dilating of sphincter ani, and in the later stages the animal will kick at the abdomen, moan and strain violently, as if trying to defecate.

Manual examination per rectum should reveal a tense, full condition of the bladder and slight pressure on the same would cause excruciating pain. It is *seldom, if ever*, we are able to locate the exact place of the obstruction in the urethra in the male, by external manipulation on account of the diminutive size of the calculi and the deep coverings of the penis.

In the female the symptoms would be similar but the diagnosis much easier and surgical interference is seldom if ever required.

TREATMENT. Medicinal treatment seems to avail but little in these cases, yet there are a great many so-called solvents, such as potassium acetate and citrate, lithium salts, hydrochloric acid, bicarb. soda, etc., but as a matter of fact all we know positively, is, that these medicinal agents *tend* to dissolve calculi in the test tube, that is outside the animal body, and it is very questionable whether they retain the same power while circulating in the blood or other tissue fluids.

It seems possible that early treatment might tend to check the formation of new calculi, but hardly credible that these medicinal agents would be able to perform the same function when we only administer a few drams of these different nostrums by the mouth, or that any part of them should ever reach the calculi in a way to be of any therapeutic benefit.

Belladonna, opium, chloral, etc., may be given to temporarily allay pain, but otherwise the time for medicinal treatment is long past before the practitioner is called.

All physical treatment or those by mechanical manipulation have availed nothing at my hands, so will not be considered here.

SURGICAL TREATMENT. Surgical treatment will be considered only in relation to the male animal as those are the ones that we are more frequently called to deal with, and the ones presenting the most serious trouble.

After careful examination per rectum you find no indication of urine in the abdominal cavity and the bladder is still distended and tense, we would first puncture the bladder through the rectum with a small trocar, allowing all the fluid possible to escape in order to relieve the tension of the bladder and so avoid possible rupture of the same in casting the animal.

One of three locations may now be selected as the seat of the operation.

1st. Ischial region. sometimes selected especially in fat cattle about ready for the market.

2nd. Post scrotal region. This is the location most generally selected for the removal of the calculi from either curve of the penis.

3rd. *Pre-scrotal region* selected for removal of calculi in anterior portion of the urethra. It is so seldom that a calculus lodges in the anterior portion of the penis that it is hardly advisable to operate in this region.

MODUS OPERANDI. To operate in the ischial region, cast the animal on the left side and secure all feet as near as possible in the extended position, in order to retain the structures to be operated upon in their normal position.

In *some* animals the operation might be performed in the standing position by the use of a local anesthetic.

The incision should begin at a point near the ischial arch and extended down parallel to the penis four or five inches. On further exploration, after the incision is made, we first come in contact with the two suspensory or retractor muscles, and just anterior to these the penis will be found. By firmly drawing the penis out of wound, sever it at the lower edge of the incision, and if there is no stoppage between the bladder and incision the urine should flow freely. If urine fails to flow, pass a director into the bladder to dislodge any calculi, mucus or blood clots that may be obstructing its passage.

Any excessive hemorrhage may be checked by firmly pinching the stump of the penis for a few minutes.

After thoroughly cleansing, stitch up the wound in such a manner that the stump of the penis will be held firmly between the edges of your incision and also allowed to extend a quarter or half inch beyond the surface of the skin. It has been recommended to insert a tube in the stump of the penis to prevent it closing, but my experience with the tube has been to always have a stricture at

the upper end of the tube in the urethra which was far, far worse than a stricture at the end of the stump.

The operation in the ischial region is not performed with a view of removing the calculus as it is seldom found here, but to give temporary relief with a view of an early market.

The anterior portion of the penis and the calculus which, in all probability lies in this part, are allowed to remain.

For operation in *post scrotal* region, cast the animal as before but secure right hind limb up to side of abdomen and toward the shoulders.

Make your incision along the median line, beginning about a hand's breadth behind the scrotum and extending back four to six inches. By making a long incision here we are enabled to reach both superior and inferior curves of the penis more easily. Separate the two parts of the retractor muscles to some extent as your incision is made.

The penis can now be located and by gentle traction and manipulation we should be able to locate the calculus either in the superior or inferior curves of the penis, although to the unpracticed hand this is not always an easy matter on account of the diminutive size of the obstructing agent.

After locating the calculus, cut down through the *corpus cavernosum* into the urethra and remove the stone by a little pressure, or if rough and entangled in the swollen mucous membrane the knife is required to dislodge it.

When the calculus is in either of the curves it is preferable to cut into the corpus cavernosum from the side of the penis to the urethra. Some prefer making the incision from the under side of the penis as the urethra is not so deeply situated, but by making the incision in the side we have less gaping in the folding of the penis.

The incision should be made just as small as possible for the removal of the calculi. Don't be content with removing but one calculus but carefully examine before closing the wound for others as it is not at all uncommon to find two or more lodged in the same locality. A gravel located in either curve of the penis would not be over three-sixteenths to one-fourth inch in diameter and in a bull with a large penis is not always easily detected.

After the calculi are removed and the urine has escaped, examine the anterior portion of the urethra to be sure that this part contains no obstruction, as often times the mucous membrane of the

urethra anterior to calculi is so irritated and swollen that it is impossible for the animal to urinate naturally even after the calculi are removed. If the anterior portion of the urethra was not obstructed I would then close the wound in the penis with silk or cat-gut suture and also close the wound in the skin with two or three stitches and after treatment would be as for any open wound. If on the other hand we find the animal is unable to pass the urine through the anterior portion of the urethra we must sever the penis at the point where the calculi were removed and secure the remaining stub of the penis to the sides of the skin incision, thereby affording a place for micturition through the wound back of the scrotum.

All treatment in the male must be considered only as a means of temporary relief, and not as a permanent cure.

POST MORTEM APPEARANCES. Postmortem appearances on animals afflicted with urinary calculi will sometimes be astonishing to the operator. As an illustration we will consider two very interesting cases on which autopsies were held.

CASE No. 1. Case number one was that of a five-year-old registered short horn bull weighing 2800 pounds and was being fitted for show purposes. This animal was apparently in the very pink of health until on Wednesday evening in the fore part of August, the animal was taken suddenly ill. After a thorough examination, the case was diagnosed as one of urethral calculi. Considering the use to be made of the animal and the seriousness of the operation in so plethoric an animal, his destruction was advised. The postmortem in this case revealed no calculi at all in the urethra, but the mucous membrane throughout the whole length of the urethra was badly swollen, black and congested. The inner walls of the bladder presented the same appearance as that of the urethra, only in a worse state of decomposition; the interstices between the mucous and muscular coats tending to suppuration. The mucous coat could be torn loose from the muscular coat in one solid sheet of diseased tissue. On the floor or internal inferior surface of the bladder, extending from the fundus to the beginning of the urethra, was one solid sheet of a tough gelatinous deposit, and imbedded in this gelatinous deposit were thousands of calculi varying in size from a small mustard seed to that of a common, white bean.

The ureters seemed about normal, but the pelvis and tubules of the kidneys contained a great number of small calculi, and a small amount of gelatinous deposit.

The cessation of micturition in this case seemed to be caused by the swollen and congested state of the urethra and the gelatinous deposit in the bladder and not from any single calculus.

CASE No. 2. Case number two was a white registered short horn steer, calved the last of October, 1902, and destroyed the first of November, 1903. It was the intention of the owner to fit this calf for the fat stock show, and the calf was allowed to nurse two cows, both of which were heavy milkers. This calf thrived well until the middle of the following February, when he was taken ill with symptoms of cystitis. The treatment was given with apparently complete recovery, but the owner was appraised of my belief that calculi were the initial cause of the trouble.

May 28th, following, I was again called, and found the calf showing typical symptoms of urethral calculi. The animal was cast and we operated in the post-scrotal region: calculi were found in the superior curve of the penis.

The anterior portion of the urethra was so badly swollen and congested that the urine failed to pass satisfactorily so the retractor muscles and penis were severed at this point and the parts arranged to accommodate the passage of urine in the rear of the scrotum.

This animal seemed to make satisfactory recovery, and gained ninety pounds in July and seventy pounds in August. About September first he began to decline, get stupid and refuse feed until in the last of October he was destroyed.

On post-mortem the urethra in the remaining stub of the penis was in about the same condition as that of case number one. The bladder was about the same as in the other case, but containing a greater abundance of small calculi, although there was not so much of the gelatinous deposit.

The left kidney contained a considerable number of small calculi. The right kidney was about five inches in diameter and ten inches in length. The tubules and pelvis of this kidney were a veritable sand bank. The calculi in this kidney ranged in size from a mere atom to an agglutinated mass that was three-quarters of an inch in diameter.

Taking into consideration the complete history of this calf, my conclusions are that this animal was affected with urinary calculi while very young, and also at a time when his sole diet was only milk.

ABSTRACT OF DISCUSSION.

DR. MAYO: A stock man in Cuba sent me an eight ounce bottle which was nearly filled with calculi taken from an ox's bladder, which varied in size from very small shot to that of a large pea. Most of these looked almost like gold beads. They were of a brilliant metallic luster and were arranged in consecutive layers. Some were dull on the outside, and if you took off the layer you would get a beautiful spherical lustrous calculus.

I do not know the cause of this beautiful iridescence, but an ordinary handful looked like gold beads of a rather dull color.

DR. JOSEPH HUGHES: Dr. Jones seems to have a corner upon calculi and the urinary deposits, especially in the bladder and urethra. He has, prior to now, published many of these remarks and observations in the Press.

I have seen this disease in many of the Middle Central States. Just a few weeks ago I was studying the symptoms in a bull in which my diagnosis was correct, and yet I was at sea as to what to do. The herdsman was absent and no one seemed to know much of the prior history of this animal. The owner invited me to remain and visit with him for half a day, until the herdsman returned, and he told me that on several occasions the bull had the same symptoms, and by waiting and giving him the usual nitre he expected a calculus to pass in a short time, and sure enough it did. It was very small, but it gave prompt relief to the animal. The animal was nervous, irritated, a full bladder—showing all the symptoms of the renal colic. All these subsided in a short time.

To me these urinary deposits are of extreme interest. It took me just twenty-five years' search to find the calculus in a horse, and on many occasions I thought I had the symptoms and thought I would have the opportunity to demonstrate my surgical ability, and strange to say the operation was a very remarkable success. Then followed two or three in rapid succession. In the meantime I acquired a very fine collection of calculi.

In the dissecting room, during twenty and thirty years' experience, I got some marvelous specimens of renal calculi, one as large as my fist. It was in the horns of the pelvis and like a pipe-stem in the ureter.

Another specimen was sent me by a veterinarian, in which the animal died of colic. He found in the pelvis of one kidney a simply

enormous calculus that was never suspected before. How the secretion of the kidney could pass, unless the pelvis accommodated itself to the enormous bulk of this, was a problem. But we have in the bull, especially, a remarkable problem with regard to these formations. We have, first of all, an excretory channel that is very singular.

The urethra in a bull is widest at the bladder and tends to contract all the way through, and, of course, at the extremity of the penis, is extraordinarily contracted. The calculus is bound to become lodged just as soon as it reaches the contracted portion, or a portion sufficiently contracted by the lumen of the penis. At the same time, many claim to get wonderful effects from Belladonna, Saw Palmetto, etc. That is a combination by which I have succeeded in relieving these symptoms of marked adhesiveness in bulls. We do not always find the calculus.

I have seen dogs treated with this same mixture, and the proprietary preparation, Sanmetto. I have seen dogs put on that and it was marvelous the number that would pass. They came out in a regular handful and actually filled the bottle—nearly a two-ounce bottle—and to me it was a demonstration that we have drugs that are effective under certain conditions.

Must we stand by and see a wonderfully valuable animal die, and still feel that we have not confidence to take our knife and search for that small calculus? But when we come to see the small diameter of the urethra and come to think of the curve—the “S” of the penis—tangled in there back of the scrotum—the “S” is situated above the scrotum and behind it—it is a rather discouraging thing, to say the least.

It oftentimes occurs to me there should be some device by which we could explore that canal in the bull. It looks discouraging. But this surgery along the tract, while it may be productive of relief, leaves the animal, ordinarily, a useless breeding proposition.

DR. C. J. MARSHALL: I have had many cases in dogs and it is a simple operation to locate them in these animals. You locate them with a catheter and they usually get well; but I was wondering how he could locate a calculus or how he would know where to put his catheter. It is remarkable to me how he would make the diagnosis. I might know the animal could not urinate, but I would not know whether the calculus was to blame for it or not. I would like to know a little more about he locates them.

I have had a few cases of calculus in cats, and it is a pretty hard matter to handle them. The urethra is small the penis not large, and it is difficult to do the operation. I was never able to handle an operation of that sort very successfully, but I remember a very nice Angora male cat that was taken sick and frequently attempted to urinate and passed a few drops of blood, and that was about the only success he had in trying to urinate. I hesitated about trying to operate and I prescribed Sanmetto, and I was surprised at the results.

I have tried it on dogs but with no success, and it always terminated in an operation with them; but I am satisfied in cats you can get good results in using Sanmetto.

DR. JENSEN: With reference to the cat,—how do you know it is calculi?

I have had some little experience in years gone by with cattle,—but I always found them on post-mortem.

Some years ago I was called to see a case belonging to a ranchman outside of our town, and I found the steer with what I thought to be a case of dropsy, leaning against the rack. I am quite sure it was dropsy by what I found afterwards. In making the examination I could feel any amount of what I suspected to be gravel, and furthermore, the condition of the animal was such that I did not encourage any treatment at all and induced them to kill it. The only surgery I did was a post-mortem. There I found a ruptured bladder and I have some of the specimens of calculi here—seven as big as a hazel nut. There was a teacupful. The urethra was completely blocked.

I have put up a great deal of Sanmetto for physicians on prescription. I am really marvelling at its send-off.

As to the nitrous ether, I cannot understand why it should get that action. It is supposed to stimulate urinary secretion, and the only theory I can advance is that it possibly does.

With reference to the results that the herdsmen get from nitrous ether,—that is another eye-opener. I simply cannot account for it. I am so interested in this matter that I hope before long I will be able to find out.

DR. JONES: Dr. Marshall wished to know how I knew it was a calculus. I am pretty sure it was. The cat was passing blood, and upon palpation, I found an enlargement on the penis.

DR. HUGHES: I would like to take issue with Dr. Jones in re-

gard to the action of Sanmetto, because wherever there is urinary irritation, one naturally seeks the dispensary or pharmacopeia for a remedy. You do not want to use the knife immediately.

Now, we do get marvelous results from Sanmetto. I do not do dog practice or cat practice. Saw Palmetto is a common drug. I get the combination and get the most marvelous effects in animals that are profusely urinating. Just at this time, in my own practice, there are cases in which the symptoms are largely kidney, and one is astonished at the effects—where the urination is a steady, dripping—dripping.

You say that Saw Palmetto is a urinary stimulant. It has, in my opinion, a distinctly retarding effect upon the eliminations of the kidney. It may have a tonic effect. I do not know what a tonic is. The term "tonic" does not stand for anything, but it seems to get the cells of the uriniferous tubes active—to get them through the nervous system.

I believe with Dr. Marshall that it is out of the question, in the majority of these cases, to locate the calculus. I think I know my anatomy fairly well, and just exactly the course taken by the urethra from start to finish, and I have gone over it and failed absolutely to find the location, although I knew it was calculus, but I play a winning game many times.

This question in the case of the bull cannot be over-estimated.

DR. JENSEN: Dr. Hughes was speaking of calculi and not of the irritated condition of the urinary canal.

I stated that the action of those drugs was stimulating in colic. We find the condition of urine is due to the hyper-acidity of the urine, which would be apt to be true in cats and dogs, owing to carnivorous habits. The bull is not carnivorous. At least I have never seen him at it. But owing to the hyper-acidity which naturally would be expected in those conditions, Saw Palmetto will neutralize the condition and hence remove the cause. The general conception of Buchu is that it is a diuretic. There is not much to it except that it disinfects, due to certain chemical action. It disinfects the kidney.

DR. O'NEILL: I would like to ask Dr. Hughes if he considers it an impossibility, owing to the structure of the urethra of the bull, to pass a catheter? That is, where we have no obstructions—and for diagnostic purposes.

DR. HUGHES: The question put by Dr. O'Neill has often appealed to me, but when one comes to lay open the tract or to probe it, to take into account its wonderful length, the fact that its caliber is so small at the outlet and so large at the bladder, it would look as if it were impossible. Besides in order to make it practical, one would have to be able to seize the extremity of the penis. To do that would cause considerable difficulty.

DR. O'NEILL: Would you anesthetize your animals?

DR. HUGHES: No, but when you come to manipulate the sheath of a valuable animal you are liable to have an adhesion—in fact, the surgery of this tract looks like a nearly impossible problem.

I hope that we are nearing the time when our younger men will succeed in devising some way of effecting that.

DR. O'NEILL: We have had in this last year, perhaps, more trouble than we have had in our experience in treating bulls, but we have been treating some full-bloods. In our section we are bothered with fox-tail. We find that they lodge around the end of the penis—the upper portion of the scrotum—and you will find that they get tumor formations, and we have simply to find means of dilating and removing or throw up our hands, and we have passed one or two catheters. We have dilated simply by using a force-pump and grasping the end of the scrotum and using force enough to dilate and to break down the adhesions, and we have succeeded in three cases of very valuable bulls, which would be otherwise useless.

By laying these bulls down and putting them to sleep under complete anesthesia, I am able to grasp the end of the penis, and by pulling forward tensely enough, can straighten it.

DR. JONES: Mr. Chairman, I am not expert in diagnosis on this urinary trouble, but it gives me as little trouble to diagnose a urinary calculus as anything I have.

In the first place, we were fortunately working on an animal in which we could make a manual exploration per rectum. By lubricating the hand and inserting into the rectum fifteen or eighteen inches and bearing down, it is very easy to detect an extreme, tense hard condition of the bladder. At the same time, the animal will invariably strain and many times will bellow from pain.

Another set of symptoms: If we are all observers, (which we should be, and I think are), and would observe the steer or the bull in the act of micturition, there is a continual pumping of the tail

up and down, for relaxation, and contraction of the sphincter ani. Invariably those go with the male animal in micturition. When they are affected with calculus you will find them continually affected with that motion, and if you are observant there is no passage, and by manual exploration we arrive at the conclusion that the animal is affected with calculi, although in Case No. 1, as I said—a registered short-horn,—and five thousand dollars would not have been any temptation to that owner of that bull. It was a serious proposition in that case.

On the post-mortem we did not find any calculus in the urethra, but from the irritation, from the bladder on down throughout it was occluded beyond any possibility of urine escaping through the urethra.

The symptoms that I have just related would hold good in all cases. If there are any further questions about the symptoms, I will answer them; if not, I will remark on treatment.

DR. MARSHALL: How do you locate the calculus when it is not in the urethra?

DR. HUGHES: How do you locate the calculus between the pelvic arch and the extremity of the penis?

DR. JONES: I think that I said in my paper that I had never yet been able, by external manipulation to locate anything, notwithstanding we were taught that way. It is a false idea. Not only that, many an operation have I had when it was hard to detect a calculus not larger than a grain of wheat—with the penis exposed. I was in company with a very eminent surgeon at one time. He was operating as an assistant to me, and he said to me afterwards, "It was not half so easy to locate it after I exposed the penis as I supposed it would be."

You must be very careful. I would commence at the superior end. If you find the calculus there, then go very, very carefully, in order to locate it at all. It is not an easy job when it is exposed.

DR. HUGHES: Have you ever passed a catheter or made an endeavor to explore the extreme lower extremity in a bull—by means of a catheter or anything else.

DR. JONES: Not in these cases, nor in any other. Experience has shown me in these cases, when there were swollen and irritated conditions of the urethra, it was sufficient to block the passage of urine without a calculus being there,—what chance has a catheter? Case No. 1 was one of those.

DR. O'NEILL: Did you make an effort to try it?

DR. JONES: No, sir, I just made the statement that it can be done. In some cases it can.

In regard to our medical treatment (which has been spoken of) there was no reason at all in case No. 2, as described in my paper. It was an attempt made on my part to save that calf with the object the owner had in view,—of a show calf; and to see what could be accomplished by the medical treatment. I think, in that case alone, if in no other, our treatment was entirely satisfactory. I think the calculi in that case increased wonderfully. The owner of this calf was a very wealthy man. There was nothing that he would not do in the medical or surgical treatment to save the calf, and as I said, after our treatment, at the end of the year, we found the kidney a veritable sand-bank. How many he passed, I know not. If he passed any considerable number, they were accumulating very, very fast.

Now, undoubtedly, in that calf's first symptoms there were good results, as Dr. Hughes has stated. We got results from February until May. This animal might have passed several during that time, but the finish came later on, as I stated in the paper.

I believe it is useless, after they become affected, to try to prolong life, with any expectation of accomplishing anything valuable. That is, we have accomplished nothing. We simply keep the animal alive, and our results, in the end, I believe are disastrous.

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LOBELINE SULPHATE

G. H. CONN, D. V. M., Prairie Depot, Ohio.

Lobeline is the active principle of *Lobelia Inflata* or Indian Tobacco; in large doses it is a powerful emetic, but the depression is so great that it is never administered for this action alone.

It stimulates the secretion of the mucus and also the secretion of the bronchi, the pharynx, the stomach and of the intestines. It also has some diuretic properties and is a diaphoretic. Perspiration may occur very soon after its administration. It reduces blood pressure. After the initial symptoms have passed off, the temperature is reduced and there is depression of the muscles generally.

Lobeline is indicated in those gastric conditions in which there is a lack of sufficient secretion, and in those cases of constipation due to lack of intestinal secretion. Also in dry, hard coughs, due to irritation of the throat and bronchi. It is also of use in conditions of the upper air passages which are of a catarrhal nature. It is a general relaxant and may be employed in obstetrics to dilate the rigid os and stimulate tardy labor. It finds its greatest use in the treatment of tetanus combined with tetanus anti-toxin in veterinary medicine. It is also of use in asthmatic affections of the domestic animals and may be of value in relieving strangulated hernia.

Lobeline is best administered to the domestic animals hypodermically, using the sulphate. If you have not the lobeline you can use specific medicine, lobelia prepared by Lloyds or the special hypodermic lobelia of Lloyds which is a non-alcoholic preparation. I have used it in 5 c. c. to 10 c. c. doses in tetanus and have also used the lobeline sulphate and have had very satisfactory results with them.

In canine practice the hypodermic lobelia or the specific medicine lobelia should be used in 15 to 30 minim doses for the same indications that I have given for the larger animals. Never use a fluid extract or a tincture as you will get abscess and other objectionable after effects.

AN EXPLANATION: In order that the editorial statement in the October issue and the statement of ownership, management, etc. on page 268 of the present issue will not appear to be inconsistent, we will explain, that according to the postal authorities, the name and place of publication do not change until an issue under the new name at the new address has actually been mailed; and as Dr. Ellis got out the October issue from the old address, they recognized no change, and requested statement of October 1st to be made as though no change had taken place, although the AMERICAN VETERINARY REVIEW really became the property of the American Veterinary Medical Association on that date. A further explanation of the delay in the receipt of the numbers of the October issue by subscribers, after Dr. Ellis had exerted every effort to get it out very nearly on time, (even though his work on it did not begin until his return from the Oakland meeting) is that the issue was held up at the post office on a technicality, relative to the change of name.

REPORTS OF CASES

MY FIRST ACTUAL EXPERIENCE WITH FISTULA OF THE EAR.

J. E. STRAYER, Hartington, Neb.

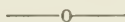
On Sunday, December 18th I received a telephone call to come thirteen miles to see a bad case of distemper (Strangles). The wind was blowing a gale, such as we have in Nebraska occasionally: this interfered materially with the telephone service. The meagre message informed me that a colt has had the distemper two weeks and has a running sore on the ear. Come at once. On arrival I found a two-year-old colt, draft type, with a fistula half way up the ear, discharging a thick, dirty whitish substance, somewhat resembling the white of an egg. Immediately below the fistula was an enlargement filled with the grumous substance mentioned above. Pressure on this enlargement caused a discharge at the fistula; and just below this enlargement a solid object could be felt, which projected about three-fourths of an inch above the parietal bone. It's outline could be distinctly felt and I had no hesitancy in saying it was a tooth formation.

The parties claimed the colt had this discharge about two weeks, but further inquiry brought out the fact that they had owned the colt two weeks and did not know how long the condition had existed. The original owner was consulted at a later date which brought out the fact that the colt had an enlargement there when he was two weeks old.

The parties were advised to bring the colt to town where he could be placed on the operating table. This they did the next day. The field of operation was shaved, disinfected and cocainized as deeply as possible. A horizontal incision was made, the tissues were removed and this revealed the odontome which was surrounded by a substance macroscopically resembling alveolar periosteum, which adhered very tenaciously to the tooth and parietal bone. The forceps were applied with hopes of removing the periosteum and tooth in toto, but the capsule crumbled under the pressure of the forceps. Several futile attempts at extraction were made and it seemed that the parietal bone was very likely to fracture, but after

a long, continued rotary movement I was able to extract the tooth, which was one and one-half inches long and nine-sixteenths inch in diameter at the crown and gradually tapering to the fangs which were four in number, and about the size of straws. There was just enough space between the fangs so their outlines could be distinctly seen.

The molar had a roughened or carious appearance with a groove running from one fang around the tooth and communicated with the fistula at one point of the crown. This point was as white as it is possible for ivory to be, which proved conclusively that the object was intended for a pre-molar. The outlines resembled the third upper pre-molar. The crown was directed upward, fangs downward and inclined inward toward the petrosal bone. Forty grains of bichloride of mercury were placed in the cavity and held in position by some cotton. The colt was sent home the ninth day apparently not feeling worse as a result of the operation and treatment.



CARCINOMA OF THE LIVER IN A DOG.

CRITTENDEN ROSS, D. V. M., New York, N. Y.

A dachshund was presented at the office one evening with the history that she had been failing for some time; that she tired very easily when at exercise, that the digestion had been poor and that this time the patient under consideration had had a very severe attack of vomiting. The patient was treated accordingly, but it succumbed before morning. An autopsy was held which revealed the following:—Animal slightly emaciated and anemic, the stomach appeared congested and at points the mucous membrane appeared hemorrhagic, the lungs showed post-mortem stasis and a mucous exudate in the trachea, bronchi and bronchioles. The liver contained a tumorous growth which was sent to Dr. B. F. Kaupp for laboratory examination and who was kind enough to make a photograph of a section of the same as well as a laboratory report, both of which follow.

REPORT OF DR. B. F. KAUPP, PATHOLOGIST: A specimen of the liver of a dog was received at the laboratory from the clinic of Drs. Ellis and Ross 8/10/'15.

The liver contained a tumor measuring 3 cm. x 3 cm. x 4 cm. and appeared lobulated.

The sectioned surface through the center of the tumor ap-

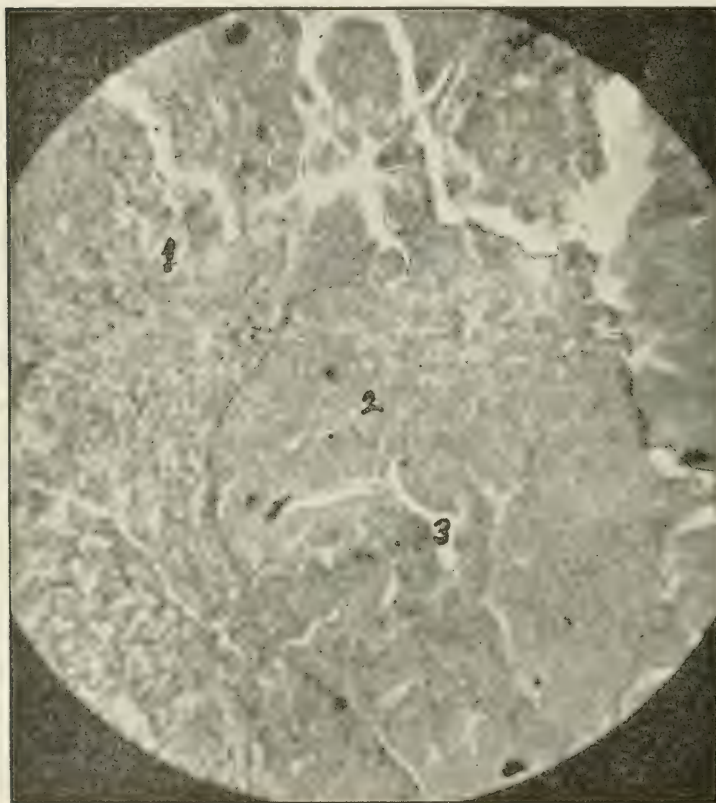


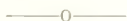
FIG. 2.

1 Normal liver tissue. 2. The tumor cells. 3. Connective tissue.

peared whitish in color and cut as though a small amount of connective tissue was under the knife. The whitish areas appeared to be invading, rather irregularly, the liver tissue and was not encapsulated.

A specimen about one centimeter square at the juncture of the apparently healthy tissue and tumor was prepared and sectioned and stained with hematoxylin and eosin.

The microscopic study showed a carcinoma of the liver. (Figure No. 2-. The study showed the tumor tissue to be throwing out masses of cells protruding and invading new surrounding liver tissue. The cells were typical cancer cells possessing large cells with rather large nuclei containing chromatin granules and were nested in masses in spaces formed by adult type connective tissue.



CASES OF AZOTURIA AND THEIR TREATMENT.

W. J. CLEVELAND, Havre, Mont.

The first case was a bay mare, weight of 1200 pounds, five years old. The mare had been worked on a plow all day until 5 P. M., when the owner noticed that she began to sweat profusely and hang back. He kept her going until she went down. After he had her unhitched she got up and he took her to the barn, a distance of about one-half mile. When he got her into the barn she went down again and could not arise. I arrived at about 6 o'clock P. M., catheterized her and found the urine coffee colored. I then gave her the treatment as outlined on page 239 of the April number of *Veterinary Medicine* with the exception that I gave the turpentine 1 oz. in an emulsion of olei lini and whites of eggs. I gave it this way to lessen the irritation of the mucous membranes of the digestive tract.

I followed this with aloin, 4 dr.; spts. etheris nit. 2 oz.; chloral 1 oz. in capsule. I made her as comfortable as possible and left her for three hours.

I then gave her turpentine, 1 oz. (in emulsion); spts. etheris nit., 1 oz. Three hours after this I again catheterized her and repeated the last dose. I gave her turpentine 1 oz. every three hours until 8 ounces had been given. Her bowels moved rather freely in the first stages, so I did not give arecoline.

After the 8 ounces turpentine had been given I gave stimulative treatment in the form of nux vomica and alcohol. The mare got up 30 hours after first going down and made an uneventful recovery.

CASE No. 2. Black gelding, weight 1400 pounds. Was noticed to be lagging behind the other horses in the field. This horse was attacked after working all day until about 5 P. M. The owner took the horse to the barn as soon as he noticed the symptoms and had no sooner arrived at the barn when the horse went down and could not get up.

I arrived at 9 P. M., found the gluteal muscles greatly swollen and very hard. I followed the same treatment as in case one with the exception that I used hot packs on the muscles of No. 2. This horse got up after being down 36 hours. He did not recover fully for several days, due to the muscles being so badly swollen.

The other cases were not so bad as the two above mentioned. These being cases in which the muscles became hardened but the horses did not go down.

I gave each of these not to exceed four ounces of turpentine during the first 8 hours. I used stimulative treatment to the affected muscles, and in cases where there was much nervousness I used chloral hydrate in the first stages following with stimulative treatment as in cases one and two.

I have better success with the treatment as outlined in treating azoturia than with any other treatment I ever used. However, I have not used this long enough to say that it never fails. It was gratifying to me for I had, up until this time, tried every thing I could hear of in treating azoturia.

A call has been issued by Assistant Secretary of Agriculture Vrooman for a conference to be held at Chicago, November 29th and 30th to consider ways and means relative to "preparedness" and properly financing campaigns against future visitations of Foot-and-Mouth Disease and to co-ordinate the work of federal and state authorities.

It is expected that the meetings will be attended by state live stock sanitary officials, agricultural college experts, practical stockmen, veterinarians and representatives of various other branches.

ABSTRACTS FROM RECENT LITERATURE

CHRONIC CONTAGIOUS ENTERITIS OF CATTLE

Der infektiöse Darmkatarrh des Rindes

PROF. DR. MIESSNER, Hanover.

Tenth International Veterinary Congress, London, 1914.

Chronic contagious enteritis of cattle is termed *bovine paratuberculosis* and the causal organism the *bacillus paratuberculosis bovis*. In cases where it occurs in the sheep the bacillus is called the *bacillus paratuberculosis ovis*.

The paratubercle bacilli were successfully cultivated upon media containing dead acid-fast bacilli or their extracts, by Twort and Ingram in 1910, and subsequently by M'Faydean, Sheather and Edwards, and Holth. Cultivation is possible upon media to which either dead acid-fast bacilli or their glycerine extracts are added.

Paratuberculosis must be considered as a disease *sui generis*, which has nothing to do with tuberculosis.

The bacillus of paratuberculosis is distinct from the tubercle bacillus.

Paratuberculosis may be diagnosed by means of a vaccine prepared by Twort and Ingram from the paratubercle bacillus. In certain cases the bacillus may be searched for in the feces after treatment with anti-formin and centrifugation.

Paratuberculosis is principally a disease of the cowshed.

The causal organism may gain access to the body during the period of suckling. For this reason, as one of the measures to be adopted against the disease, calves should be reared separately, on infected premises. In connection with the dissemination of the disease from animal to animal through the medium of contaminated straw, suspected or diseased animals must be isolated as promptly as possible and their standings thoroughly disinfected.

Immunization by means of dead bacilli should be investigated.

M'Faydean has recorded a case of the disease in a deer.

Paratuberculosis has been found in sheep by Stockman and by M'Faydean, Sheather and Edwards. Sheep and goats have also been successfully infected by inoculation with pure cultures of the paratubercle bacillus.

THE CONTROL OF THE PRODUCTION, DISTRIBUTION AND SALE OF MILK IN THE INTERESTS OF PUBLIC HEALTH.

Le Contrôle de la Production, de la Récolte, de la Distribution et de la Vente du Lait dans L'Intérêt de la Santé publique.

PROF. CH. PORCHER, Lyon.

Tenth International Veterinary Congress, London, 1914.

The author gives an account of the difficulties introduced into the milk question through the intervention of typhoid carriers, and the transmission of Mediterranean fever through the medium of milk derived from apparently healthy animals.

To render the work valuable from a prophylactic point of view, these facts must be submitted to a closer examination. The serum test, or the "lacto-reaction," must be carried out upon goats derived from places that are infected with Mediterranean fever.

The hygienist, in order to follow the matter to a logical conclusion, should also carry out serum tests upon the people employed at farms and dairies. In this way it might be possible to eliminate carriers who are responsible for so many important outbreaks of abdominal typhus, originating from contaminated milk.

M. Porcher emphasizes the importance of dirty milk as a cause of infantile mortality. He advocates a very thorough inspection of dairies, including not only the animals, but the premises, water supply, etc.

Finally, he advocates the creation of a complete and homogenous course of instruction regarding milk under a single professor in the veterinary schools.

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THE CONTROL OF CONTAGIOUS EPITHELIOMA IN CHICKENS BY VACCINATION.

WINFRED B. MACK AND EDWARD RECORDS.

Bull. No. 82, Ag'l Expt. Sta. of the Univ'y of Nevada, Reno, Nev., June, 1915.

The authors conclude that the etiological identity of roup, avian diphtheria and contagious epithelioma is a subject of controversy which requires further extended research to settle. For that reason it is uncertain whether the cases dealt with in the experiments were caused by pure contagious epithelioma virus or were due to mixed infection.

The use of a virus prepared by triturating the morbid products collected from the skin and mucous surfaces and attenuated at 50 °C. for one hour checked the spread of the disease promptly and exercised a favorable influence upon visibly infected birds. Cases thus treated ran a shorter and milder course than those not treated and the mortality was materially reduced.

On the whole, the treatment was found satisfactory and successful. In five flocks no unfavorable results followed the subcutaneous administration of the vaccine, but in two flocks serious toxic and septic processes were apparently caused by it. The crude preparation used is not, therefore, without danger and a more refined product must be devised. However, the conclusion that in this method there is a fairly efficient means of promptly checking outbreaks of contagious epithelioma or the other uncertainly defined diseases, if there is more than one capable of producing similar morbid conditions in fowls, and a therapeutic agent of considerable value, seems warranted. Furthermore, the prevention and control of this disease, or group of diseases, may eventually be placed on a sound, scientific basis seems likely.

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THE SEPARATION OF THE ANTI BODY FRACTIONS IN HOG-CHOLERA SERUM.

FREDERICK EBERSON.

Journ. Infec. Dis. Vol. 17 (1915), p. 339.

This work was attempted in order to find whether it was possible to separate hog cholera serum into active and inactive parts. The experiments were based on the work of Gibson and Banzhof of the Department of Health of New York City on the concentration of diphtheria antitoxin. These workers have shown that artificial concentration is practicable.

As a result of his experiments the author reaches the following conclusions:

"Hog cholera serum can be split up by chemical means into an actively protecting globulin fraction and an inactive albumin fraction.

Precipitation of serum proteins by means of ammonium sul-

phate is practically possible for hog-cholera serum. The bulk of the serum, being inactive albumin, may be dispensed with.

Concentration for practical purposes may be effected (1) by precipitating the euglobulins from diluted serum, by means of 33.1-3 percent saturation with ammonium sulphate solution, filtering, making the filtrate up to 50 percent concentration with ammonium sulphate solution, filtering, and after dialyzing the precipitate in running water, dissolving it in the smallest volume of salt solution; (2) by precipitating the diluted serum (diluted 10-15 times) by one-half saturation with ammonium sulphate (saturated solution), filtering, dialyzing the precipitate, and treating as in (1). Since both globulin constituents are protective, this method would prove more economical and simpler.

Euglobulin represents from 20-21 percent of the total serum protein, pseudoglobulin 0.5 percent, and albumin about 80 percent."

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CONTAGIOUS ABORTION IN DOMESTICATED ANIMALS.

Ueber das seuchenhafte Verwerfen der Haustiere.

PROF. DR. ZWICK, Vienna.

Tenth International Veterinary Congress, London, 1914.

The contagious abortion of cattle, which has a wide distribution, is caused by Bang's abortion bacillus.

Agglutination and complement-fixation tests are valuable aids in proving the presence of the infections in cattle. On the other hand, precipitin tests and inoculations with abortin have not been found to be of much value.

It is not possible by means of the agglutination and complement-fixation tests to predict the occurrence of abortion.

Under natural conditions infection occurs through the medium of the bull or through the ingestion of infective material. The introduction of infective material into the genital passages from infected straw or discharge plays a very inconsiderable part in the process of infection.

Contagious vaginitis is not considered to be a cause of abortion.

Veterinary police regulations appear to be less suitable for combating the disease than private regulations giving well informed owners information regarding the nature, treatment and prevention of the disease.

Further investigations are necessary in order that a suitable method of immunizing against the disease may be discovered. Special attention should be paid to the question whether it would be possible to carry out immunization of calves and young cattle, so as to confer a degree of immunity which would be of practical value.

Further research is necessary regarding the etiology of contagious abortion in the mare, sheep, goat and pig.



DOURINE AND THE COMPLEMENT FIXATION TEST.

E. A. WATSON, V. S.

Parasitology, Vol. 8 (1915), p. 156.



Dourine is a disease which is assuming more and more importance in the United States. One of the perplexing problems in connection with the disease is diagnosis. The Bureau of Animal Industry has, for some time, used the complement fixation test as an aid in the diagnosis of this affection. Dr. Watson, working at the Veterinary Research Laboratory at Lethbridge, Canada, writes this paper after an experience of 15,000 tests with complement fixation for the diagnosis of this affection. The procedure and technique are given in detail and in a manner readily understood. Among other general remarks in conclusion the author states:

"The successful practice of the complement fixation test depends mainly upon the preparation and use of powerful reagents, their specificity and the accurate determination of their relative values, the fixing of standard doses wherever possible, and a constant, uniform technique and method of procedure.

Close familiarity with the activity of the reagents is essential for the best results.

Stock reagents should be prepared in quantities calculated to meet all requirements for as long a time as the activity of the reagents remains practically constant. Thus: sufficient haemolytic serum for six months' work; antigen to suffice for one month's work; fresh red cell suspension once a week; fresh complement daily or on alternate days, or as needed. It is advisable to use the blood of two sheep for sensitizing rabbits and to use the red cells of the same sheep for the haemolytic system."

In a discussion of some practical questions which arise in the use of this test we find, among others, the following:

"Can the test be practically applied?" Yes, without doubt, and with as much ease as a mallein or tuberculin test is applied. In the one case blood is collected in the field and sent in for a laboratory test, in the other the reagents are prepared in the laboratory and sent out for a field test. Further, as many retests can be made by the complement fixation method as desired, for no toxins or immunizing substances are injected into the suspected animal to interfere with subsequent diagnostic tests. This test is no longer a new departure in veterinary diagnoses; it is successfully applied in glanders, contagious abortion and in other specific diseases and is yearly coming into more general use.

Is the technique too intricate and laborious? Not more so than many other necessary and accepted laboratory methods, and this is essentially a laboratory test.

What is the percentage of positive reactors in dourine outbreaks? This of course varies according to the length of time the disease has been in existence in a stud or range herd before being checked by preventive measures. In the most extensive outbreak that we have had to deal with 456 positive reactors were found in a total of 2000 animals tested; nearly 23 percent. In an outbreak on an Indian Reservation, 127 animals gave positive reactions out of 1464 tested, or less than 9 per cent. Usually it is between 15 and 20 per cent. Our experience indicates that 100 per cent. of dourine infected animals, whether in active or latent stages of disease, give positive serum reactions, provided that an interval of two to three months has been allowed for an incubation period in the more or less resistant animals, less than one month being sufficient in most cases.

In conclusion, I venture to express absolute confidence in the complement fixation test for dourine as it is now presented, and to claim that apparent failures or discrepancies are due, not to the method itself, but to faulty technique on the part of the operators or of the collectors of the test serum."

FITCH.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

The first business meeting of the combined fifty-first and fifty-second meetings of the American Veterinary Medical Association was called to order by the president, Clarence J. Marshall at 10:30 o'clock A. M.

PRESIDENT MARSHALL: Ladies and Gentlemen:—The time has arrived to call to order the regular fifty-second stated meeting of the American Veterinary Medical Association. The meeting is now in session.

The gentleman who is on the program to deliver the address of welcome, the Honorable Victor H. Metcalf, ex-secretary of the Navy, is sick, but we have another man in his place. It gives me pleasure to introduce to you Mr. H. C. Capwell of the Chamber of Commerce of Oakland, who will deliver the address of welcome.

Mr. Capwell's address of welcome, Dr. Rutherford's response and President Marshall's address were printed in the October number.

PRESIDENT MARSHALL: The next order of business is the roll call. If there is no objection, we will accept the registration at the door—for the regular roll call. The next order of business is reading the minutes of the preceding meeting. What do you wish to have done in reference to the reading of the minutes?

It was voted that the report as published in the proceedings be accepted.

PRESIDENT MARSHALL: If there is no objection, it so ordered. Is there any other business to come before the association?

DR. DALRYMPLE: I understand it has been the custom for years, or at least now that Dr. Alexander Liautard has left the United States and resides in Paris, for him to cablegram his congratulations to this association at its annual meeting. I had a communication from Dr. Liautard a short time ago and he made the statement to me that, owing to the conditions in Europe at the present time, he did not feel like sending his usual cablegram of congratulations, but that he would like to have me deliver his message verbally if I should be at the meeting. Therefore, I take great pleasure in conveying to the association, Dr. Liautard's congratulations and best wishes for the best success of the A. V. M. A.

DR. MAYO: Mr. President: I second that motion and in doing so, I want to state to the association that it was my pleasant privilege to call upon Dr. Liautard last summer and to spend a day with him at his beautiful country home in France,—a most delightful day, and the memories of this association that were presented to us there by Dr. Liautard, I am sure, expressed the intense love and affection which he has for the association and the profession in America.

DR. DALRYMPLE: Mr. President, it seems to me fitting that, even though the Doctor did not send his usual cablegram, this association should extend to him the courtesy of an acknowledgement of his congratulations, and I make a motion to that end. Seconded by Dr. Mayo.

PRESIDENT MARSHALL: It has been moved and seconded that a cablegram be sent from this association to Dr. Liautard. If there is no objection, it is so ordered.

DR. ELLIS: Mr. President: I neglected to bring with me a letter which I received from Dr. Liautard in which he asked me to convey to the association also, his best wishes and congratulations, and I will ask that that letter be allowed to become a part of the minutes of this meeting. I will see that the secretary gets it.

Bois Jerome, 12th of December, 1914.

To the President of the American Veterinary Medical Association,

My dear President and most esteemed friend:

For a few years past, it has been with the greatest pleasure, that I took advantage of the possibility of cabling the association, a few words of friendly souvenirs for all.

Those were always welcome, I knew, by the arrival of the acknowledging thanks in return.

Today, on account of the state of affairs on the Continent and of the doubtful delivery at the proper time of my usual cable, I will not permit that I shall be deprived of my pleasure, nor ignore my duties towards you and all those friends, members of our association, who have gathered in the great city of New Orleans. A Frenchman may be allowed to visit an old French city with a letter.

You will then permit me, my dear President, to ask you to accept my deep regrets of being absent from your great meeting, to present and express to all our friends my warmest friendly souvenirs and to assure all of my sincere wishes for a grand meeting with the continued growth and successful progress of our national Institution.

Frenchman-like, I may be allowed to send in this French city, in days gone, a good and hearty cry of: VIVE L'AMERICAN VETERINARY MEDICAL ASSOCIATION.

Yours very cordially,

A. LIAUTARD.

Although the above letter was written for the New Orleans meeting which was not held, it nevertheless is expressive of Dr. Liautard's never failing interest in the A. V. M. A. and the veterinary profession in America, and not to publish it in the minutes would leave a missing link in the chain that has bound him to his American confreres whom he has annually supplied since he has been unable to be with us in person.—EDITOR.

PRESIDENT MARSHALL: I will appoint Dr. Dalrymple, Dr. Ellis and Dr. Hoskins to draft that cablegram.

The cablegram so sent by that committee is as follows:

Oakland, Calif.. Aug. 30, 1915.

Prof. A. Liautard:

Bois Jerome, via Vernon, Eure, France,

Warmest thanks. Congratulations.

A. V. M. A.

DR. HARING: I would like to call attention to the new program which has been printed and which should be followed rather than the official program which was mailed to you by Secretary Mayo from Chicago, because changes in

the place of holding meetings became necessary. The meetings this afternoon will be section meetings on the Mezzanine floor. You will note by the new program that the meeting of the Association of Veterinary Faculties and Examining Boards of North America will meet in Room 101; section on Veterinary Practice will meet in the blue room; and the section on Sanitary Science and Police in the northwest room, all on the Mezzanine floor. You will note also that there is a general session this evening which is not noted in the official program, so that in arranging to attend the meetings, please follow the new program,—the large white one with the blue cross printed on the cover. The local committee on arrangements felt that the ladies and our visitors will not wish to be over-burdened with entertainment other than trips to the exposition as that is the great attraction of the San Francisco Bay region at this time. Details will be announced daily concerning our program. To-day, the ladies are asked to meet at one o'clock on the west side of the court, if they care to go to the exposition. At that time certain announcements will be made to them. Mrs. Haring has charge of the arrangements for the trip this afternoon, and if you will be there at one o'clock sharp, details will be arranged at that time for the ladies.

DR. MAYO: I would like to announce that all who have not paid their dues may do so. There is a clerk at the door who will receive your money and give you receipts and membership cards, so please see her rather than myself regarding it as she has all the data there.

PRESIDENT MARSHALL: I believe that finishes the program for the morning. I wish to warn the members to attend the meetings on schedule time. There are many attractions around here, and I fear you will get away at times when you should be here attending the meetings. I hope you will be here promptly. Be sure to attend all the meetings of the session. That is all we have this morning. If there is no objection, we will stand adjourned until two o'clock this afternoon.

Oakland, California, August 30, 1915.

The second business meeting of the fifty-second annual convention of the American Veterinary Medical Association was called to order by President Marshall at 8:00 o'clock P. M.

PRESIDENT MARSHALL: We are already twenty minutes beyond the schedule time for beginning. The secretary tells me there is no unfinished business. The first order of business is the report of the executive committee.

DR. MAYO: The executive committee has reported favorably upon the following applications for membership: (They will be read alphabetically). The list of new members was published in the October number.

The report has taken twenty minutes. It is about half done. Would you prefer to have it finished tonight, or take it up at a future meeting? We have quite a long program for tonight, and Dr. Stange, I see is here prepared to give his report. It is just as you say; we can finish it tonight if you wish.

DR. HOSKINS: I move that we take up the balance at a subsequent session of the association. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: If there are no objections, it will be so ordered.

It is so ordered. The next subject on the program is the report of the Committee on Intelligence and Education by Dr. C. H. Stange.

DR. STANGE: There are some other papers, I believe, that are to be reported by other members of the committee. I will ask Dr. Moore to present Dr. Fish's paper first.

PRESIDENT MARSHALL: What is Dr. Fish's paper?

DR. STANGE: Upon the Requirements of the Veterinarian, it is a part of the report of the committee.

PRESIDENT MARSHALL: Dr. Baker has a report to make for this committee. Is Dr. Baker in the room?

DR. BAKER: Mr. President, I have jotted down here the few ideas that have come to me on this subject, and I am naturally inclined to dive right into the pith of things without much preliminary waste of "hot air", you might call it. I will give you a few ideas which I have here on the subject of the practical side of veterinary education. According to my ideas this is a very important part of veterinary education, and you will naturally glean from the paper the point I wish to make first in connection with this subject, and that is that hospital practice is as important in the curricula of veterinary education as a diagnostic course. It holds the same relation to a course of theory and practice of medicine as the laboratory does to a course in bacteriology and pathology and the dissecting room in anatomy.

((Dr. Baker's portion of the report was printed in the October number).)

PRESIDENT MARSHALL: Gentlemen, if there is no objection, I think it would be well to hear the other portions of the report of the Committee on Education and discuss the papers at one time. If there is no objection to that, I will call on Dr. V. A. Moore to read Dr. Fish's paper.

DR. V. A. MOORE: Mr. President, this paper is entitled "The Requirements for a Veterinarian," by Dr. Fish. (Printed in the October number).

PRESIDENT MARSHALL: Dr. Stange, are there any other papers?

DR. STANGE: Mr. Chairman, members of the American Veterinary Medical Association, gentlemen, at various times in the past your Committee on Intelligence and Education has reported concerning the work that is being done in the several veterinary colleges of the United States and Canada. Inasmuch, however, as the association now has a special committee for the purpose of investigating colleges in the United States and Canada, our work has somewhat overlapped with the work of that committee.

Dr. Stange then read his paper on the subject of Intelligence and Education. (Printed in the October number).

PRESIDENT MARSHALL: The next paper of the Committee on Intelligence and Education is by Dr. DeVine, a member of the committee, to be read by the secretary, Dr. Mayo.

Dr. Mayo then read the paper entitled "Discussion of the Present Methods of Teaching" by Dr. John F. DeVine. (Printed in the October Number).

PRESIDENT MARSHALL: That finishes the report of the Committee on Intelligence and Education. What will you do with that report?

DR. S. STEWART: I am wondering whether we might not at this place call for the report of the special committee on colleges. That report is ready I understand. Let it be a part of this general discussion.

PRESIDENT MARSHALL: Where does that appear in the program

DR. S. STEWART: It comes on Thursday evening, if I remember correctly—perhaps it is Wednesday. Dr. Dunphy of that committee is here and he may have his report and can read it at this time if you so desire.

PRESIDENT MARSHALL: Do you make that in the form of a motion?

DR. S. STEWART: I move that we call for this report at this time. Seconded by Dr. R. C. Moore.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion. What is your pleasure?

DR. KEANE: We have prepared a report of the Committee on Diseases, and if you are going to take up the report of this special committee on the inspection of colleges, we will have to defer this report.

DR. MAYO: I have seen this report of the Committee on Veterinary Colleges and it bears very closely upon the subjects which we have been considering here, and it seems to me that it would be desirable to take it up now while we are on the subject, and finish it up, and that the report of the Committee on Diseases come a little later on, if necessary.

PRESIDENT MARSHALL: Would it not be possible for us to postpone the report of the Committee on Diseases?

DR. DUNPHY: Mr. President, the report is not quite ready. It was to be brought here and submitted to the various members of the committee appointed for the purpose of visiting the different colleges and making an examination of them. The report has been formally presented and submitted to two members of the committee. The other member of the committee, living here in California, has not yet had a chance to visit the different colleges, and his part of the report was submitted to the other members of the committee. I have prepared this report for Dr. Reynolds, who is the chairman of the committee, he not being able to be present, but it was the intention of the committee that Dr. Browning, the third member of the committee, should go over this report, and we should arrange it so that it would be satisfactory to the other members of the committee. Now, this report could be ready tomorrow afternoon, but in the present condition it would not be advisable to submit to the association at this time.

DR. MAYO: Mr. President, in view of this statement, I move that discussion of the report of the Committee on Intelligence and Education be postponed until the report of the other committee is received, and then we can discuss the whole subject at one and the same time. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: The motion has been made and seconded that the discussion of the report of the Committee on Intelligence and Education be postponed until the report of the Committee on Colleges has been received. Any remarks? If not, those in favor of the motion, make it manifest by saying "aye"; those opposed by the same sign. It is so ordered.

DR. D. M. CAMPBELL: Mr. President, the report of the Committee on Reorganization is ready at this time. I would like to suggest that this report be made now. It will only take a few minutes. In my opinion, it is necessary that it be read at this time in order that the executive committee may have a chance to act upon it and report it back to the association.

PRESIDENT MARSHALL: I think the suggestion of Dr. Campbell is a good one. It will take but a few minutes to read the report and it will give the executive committee time to act. Did you put that in the form of a motion, Dr. Campbell?

DR. CAMPBELL: Yes.

PRESIDENT MARSHALL: If there is no objection, we will call for that report at this time.

DR. CAMPBELL: This report which I present at this time has been gone over at length and is signed by all the members of the committee. It is a sort of compromise and is brought as an amendment to the report submitted by myself at the New York meeting, and I move that it be referred to the executive committee with instructions to report it back to the association at, say, eleven o'clock tomorrow. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: The motion has been made and seconded that the report of the Committee on Reorganization be referred to the executive committee to be referred back here to the association for full discussion tomorrow morning at eleven o'clock. Any remarks?

DR. KINSLEY: Mr. President, how is the association at large to know what this compromise is? Will that be brought out by the executive committee in the report tomorrow? We have not heard this report; it has not been read. Will the association at large have an opportunity to learn just what this is?

DR. CAMPBELL: I don't think it would be advisable to read the report at this time because the executive committee will undoubtedly see fit to make some changes in it, perhaps to change it all. When they report it back, it will be read to the association at that time, and everyone will have an opportunity to hear it.

DR. KINSLEY: That is what I want to know; I want to hear the report read.

PRESIDENT MARSHALL: Any remarks? All those in favor of the motion as stated, say "aye"; opposed, the same sign. Carried, it is so ordered. The next order of business is the report of the Committee on Diseases: Dr. V. A. Moore is chairman. The members of the committee are Dr. S. H. Gilliland, Dr. A. T. Kinsley, Dr. W. W. Dimock, and Dr. C. M. Haring. Is Dr. Moore present? Are you prepared to make your report now or do you wish some part of the report made by some other member of the committee?

Dr. Moore then read the History and Distribution of Hog-Cholera in America.

REPORT OF THE COMMITTEE ON DISEASES

V. A. MOORE Chairman

W. W. DIMOCK

C. M. HARING

S. H. GILLILAND

A. T. KINSLEY

Mr. Chairman and Members of the Association :

There has been little of unusual interest relative to the appearance of infectious diseases of domesticated animals during the last two years, with the exception of the outbreak of Foot-and-Mouth Disease in the fall of 1914. The seriousness of this epizootic renders it impracticable for the committee to undertake a discussion of it at this time. As its control and finally its eradication will be accomplished through the efforts of official veterinarians, your committee feels that the Bureau of Animal Industry should at the proper time issue a complete report on the appearance, extent, control and economic significance of the recent outbreak of Foot-and-Mouth Disease, for the benefit of the profession and in a form obtainable by every veterinarian. Although some errors apparently have been made and much criticism expressed regarding the efficiency of the veterinary service in this Herculean task, your committee recommends that this association express its appreciation of the valiant services of the federal and state veterinarians in the eradication of this disease.

Your Committee on Diseases has, as requested by resolution at the New York meeting, centered its efforts in a study of hog cholera, its distribution and control in America. It seemed wise, therefore, that the work of this committee should be restricted to the preparation of this report which it is hoped will be of value to veterinary practitioners and a benefit to the swine industry of the country.

It was not until a comparatively recent date that a knowledge of the symptoms, lesions and means of diagnosing hog cholera gave much assistance to the practitioner. For this reason veterinarians, as a class, were loath to make a diagnosis of cholera, for it forecasted heavy losses from which there seemed to be no escape. At present the situation is changed. An early diagnosis is imperative for, if it is made in time and prophylactic measures taken, the majority of the herd can be saved. This places a heavy responsibility upon the practitioner who should intelligently meet his obligation both

to his client and to the community. There are few, if any, specific infectious diseases of animals that can be more satisfactorily controlled by the veterinarian than hog cholera.

In carrying out its work, the committee divided the subject matter between its members as follows:—The history, distribution and recommendations were assigned to the chairman. The symptoms, morbid anatomy and differential diagnosis to Dr. W. W. Dimock. The etiology and methods of control to Dr. C. M. Haring. Dissemination and prevention, to Dr. A. T. Kinsley. The preparation of anti-hog-cholera serum and methods for using serum and the treatment of sick animals, to Dr. S. H. Gilliland. The committee has tried to make its report as brief as possible, consistent with its purpose. It has refrained from long discussions and presented the essential facts as it sees them relative to the phase of the disease under consideration. The committee has gone over the individual parts very carefully and respectfully submits the papers prepared on the different phases of the subject, and for which the authors alone are responsible, as its complete report.

HISTORY AND DISTRIBUTION OF HOG CHOLERA IN AMERICA

V. A. MOORE, Ithaca, N. Y.

The first appearance of hog cholera in this country, as ascertained by an extensive correspondence by the Bureau of Animal Industry soon after its organization, and so far as we have since been able to learn, occurred in the state of Ohio in 1833. It appeared in South Carolina in 1837 and in Georgia in 1838. In 1840 it was found in Alabama, Florida, Illinois and Indiana; in 1843 in North Carolina and 1844 in New York. The statement is made by Ostertag and also by Hutyra and Marek that hog cholera appeared first in the United States in 1833 and that it was carried to Europe from here. The *Rec. de Med. Vet.*, 1831 contains a statement in reference to the appearance of a disease in France in 1822, that, according to the description given, was hog cholera. Fleming refers to an epizooty among swine in Ireland in 1840. There are also numerous references to disease spreading among swine in Germany and other European countries prior to 1833. The accuracy of the diagnosis of these diseases can not be assured any more

than that of the disease among hogs in Ohio in 1833. All that can be determined is a conclusion drawn from the symptoms and lesions recorded. In 1865 Dr. Budd of England published a very exhaustive article on pig typhoid in which his description of the lesions is quite similar to those found later in cases of hog cholera in this country. In 1875 Professor Axe of London investigated this disease and confirmed the findings of Dr. Budd.

While the fact cannot be proven the evidence is quite as conclusive that hog cholera was imported into the United States from Europe as it is that it was indigenous to America and taken from this country abroad. Whatever its source of origin, after its appearance it spread at first slowly but later with increasing rapidity along the lines of commerce, until it has invaded practically every part of this country where swine raising has become an industry.

For a number of years after hog cholera first appeared in the United States it did not spread rapidly, although the outbreaks gradually increased in number. In the ten years from 1846 to 1855 inclusive, 93 outbreaks were reported and it was during that period that the disease seems to have gained access to many new locations in this country. We refer to these as outbreaks of hog cholera but the diagnosis is not clear in all cases. The literature shows that in earlier years the writings on swine diseases contain a large number of terms such as enteric fever, pig distemper, blue sickness, purples, scarlatina and many others which may or may not have been the disease now known as hog cholera.

In 1858 Dr. George Sutton of Aurora, Indiana, made a report on this disease in which he quotes *The Worcester (Mass.) Spy*, "that many farmers in that city and vicinity are losing their swine by a mysterious and fatal disease known as hog cholera. In the southeastern part of this town it prevails in a greater or less extent upon every farm." He adds that in most cases the disease is traced to Western hogs that have been sold by drivers during the present season and which seemed to have communicated the contagion to the other inmates of the sties in which they have been kept.

In 1861, Dr. Edwin M. Snow of Providence, R. I., contributed a paper on this disease to the United States Department of Agriculture. In 1875, Dr. James Law of Cornell University furnished to the same department a valuable paper setting forth the symptoms and morbid anatomy of intestinal fever in swine. He believed it to be contagious although the specific organism had not

been found. In 1878 the United States Commissioner of Agriculture appointed nine men for a period of two months each to investigate the disease in various localities. In their reports considerable information concerning the symptoms and morbid anatomy that had been formerly described was confirmed. Law showed that it could be transmitted by inoculation and Diftmers described a micro-organism which was called *Bacillus suis* and which he believed to be the specific cause of the trouble. Later he described it as a micrococcus. The study of this disease was continued in the Division of Veterinary Science in the Department of Agriculture by Dr. Salmon. Its study was also taken up by certain men in other parts of the country. In 1885 Salmon and Smith announced the discovery of a specific bacterium and described its essential characters and properties. It was called Bacterium of Swine Plague.

In 1886 Dr. Theobald Smith of the Bureau of Animal Industry discovered another bacterial disease of swine. It was found to be identical with the German *Schweinescuche* and due to the same cause. This led Dr. Smith to call it, on account of its identity with the German disease, swine plague and its organism the bacillus of swine plague and to change the name of the disease described in 1885 as swine plague to hog cholera and its organism to the Bacterium* of hog cholera. Dr. Billings of the Nebraska State Agricultural Experiment Station, who was working on swine diseases, was not willing to accept the change in the nomenclature and he continued to write about hog cholera, the disease first described by the Bureau, as swine plague. His writings were widely distributed both in this country and Europe and they are in a large measure responsible for the confusion relative to the nomenclature of these two diseases.

In 1893 Dr. W. H. Welch of Johns Hopkins Medical School and Dr. Clements of Baltimore presented a paper before the International Veterinary Congress in Chicago in which they gave a clear history of the nomenclature of these diseases and in which they adhered to the one of the Bureau of Animal Industry.

In 1903, deSchweinitz and Dorset discovered what they called a disease identical with hog cholera but which they produced with virus that passed through the finest porcelain filters. Subsequent investigations by Dorset, Bolton, McBride and Niles showed that

* The genus *Bacterium* was changed in 1888 to *Bacillus*.

the organism known as the bacillus of hog cholera was not the cause of that disease but when present it was a secondary invader. They did not, however, deny that it possessed pathogenic properties for swine. The correctness of this new conception of the etiology of hog cholera was soon accepted by European investigators.

Soon after the discovery of the filterable virus, it was found that the serum of hogs that had recovered from cholera possessed a certain amount of immunizing power against the disease and that when they were hyperimmunized their serum would produce a temporary passive immunity against the virus. It was also pointed out that if the immunizing serum was used in conjunction with the virus, or the simultaneous method, the pigs became immune for a much longer time. It is this serum, known as the Dorset-Niles serum, together with the use of the virus and serum or the simultaneous method that are now being employed as prophylactics against hog cholera.

Although the fact seems to be proved that the outbreaks of cholera in this country were due to a filterable virus it was believed that *B. suispestifer* (bacillus of hog cholera) was still a more or less important factor in swine diseases. A study of the reports of the investigations of the outbreaks shows that this organism was rarely, if ever, found in the middle West. It was, however, isolated from many outbreaks in the East and its pathogenesis for pigs was clearly established by inoculation and feeding experiments. In order that the disease produced by this bacillus should be differentiated from that of hog cholera and in order that there might be a more differential nomenclature of swine diseases, the United States Live Stock Sanitary Association appointed, in 1910, a committee of five to report on the nomenclature and classification of swine diseases. After carefully considering this subject the committee reported at the meeting of the association in 1911, that the name hog cholera should be given to the infectious communicable disease of swine occurring in epizootics caused by the filterable viruses; that the name *Salmonellosis* should be given to the disease caused by *B. suispestifer* (bacillus of hog cholera) and that swine plague should remain as the name of the infectious disease of hogs occurring sporadically or in epizootics are due to *Bacterium suissepticus* (bacillus of swine plague). The report was adopted. While this nomenclature may not be the best, and while it has been adversely criticised, its justification rests in the fact that the diseases are distin-

guished by their etiology, which seems to be the one biological basis for classifying the specific infectious diseases.

There is a voluminous literature on hog cholera and many differences of opinion exist concerning it. The findings, however, are tending to the conclusion that hog cholera caused by filterable virus constitutes the greater number of the serious outbreaks among swine in this country, and that *B. suispestifer* and *Bact. suissepticus* are the causes of less serious epizootics or more sporadic diseases. The frequency of mixed infections has undoubtedly been the cause of confusion in arriving at a clear understanding of the *symptom complex* of this disease.

DISTRIBUTION. Without going into details it can be stated that hog cholera exists to a greater or less extent in every hog raising state in the Union. It is much more prevalent in those sections where hog raising is an important industry and where naturally there is more interchange of animals for breeding and other purposes. In Canada it is reported not to be common except in certain restricted areas. In those sections of the country where it is less prevalent it is found most frequently in garbage fed herds about large and small cities. The results of definite experimental work have shown that the probable source of infection in the garbage is the scraps of raw pork that come from hogs which were infected at the time of slaughter but which did not show lesions sufficiently to cause their condemnation. It is, generally speaking, a wide spread disease and it is gradually extending to uninfected places.

REFERENCES

The following is a list of a few references of interest in the study of the history of hog cholera in the United States:

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SYMPTOMS, LESIONS AND DIFFERENTIAL DIAGNOSIS

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SYMPTOMS. The fact that hog cholera makes its appearance in various forms, in different individuals, in different herds and different outbreaks, makes it difficult to discuss with any degree of positiveness the symptoms that may be shown under field conditions. If we are thinking of hog cholera in the acute form where there is little or no secondary infection, then we have a typical acute specific infectious fever, the first symptoms of which are fever and a rise in temperature. The rise in temperature is often found to be present before the animal shows signs of being sick—in fact in the more acute cases the animal may die and the owner or attendant will not have observed any previous symptoms of ill health. In those that live long enough to show clinical symptoms, we often first notice that the general appearance of the animal is not normal, or that there is a general depression. A closer examination of such animals will show that there is a congestion of the mucosa of the eye, and the temperature will be found to be from 104°–109°. The congestion of the mucous membrane of the eye results in considerable exudation of a sero-mucus or sero-purulent exudate of a sticky character that tends to accumulate on the surrounding parts of the

eye, and often fastens the lids together. When feed is offered, the animal comes up to the trough slowly and leaves before the others have finished. There is a marked tendency to stand off alone, appearing generally dull; constipation is not uncommon at this stage although in some outbreaks of cholera, diarrhoea may be one of the first symptoms reported by the owner. The pigs are often thirsty and will drink water or swill, but refuse to take solid food. The general condition of dullness increases and the animal refuses to come out from the straw. The ears hang down, the tail is straight and there is more or less evidence of weakness, especially noticed in the hind quarters. The animals will stagger when walking or weave slightly when standing. At this stage diarrhoea is usually marked, the discharges being of a dirty gray or greenish color, and frequently contains masses or strings of mucus or of a fixed exudate. However, it should be remembered that the color and consistency of the feces depends to quite an extent upon the character of the food. The discoloration of the skin over the ventral surface of the body extending up around the neck, ears and nose, and down the inside of the legs, is in many outbreaks a rather prominent symptom. The color of the skin in such cases is of a bluish red, and is due to congestion and infiltration of the blood in these parts. This condition is most noticeable on white pigs. The reddish rusty spots frequently noticed on the underside of the body seem to be the accumulation of some secretion from the skin, and by many are considered a very suggestive symptom or indication of cholera. These masses are usually about the size of a pinhead or possibly a little larger, and the skin immediately surrounding may be slightly congested. The collection of urine in the sheath and the consequent dilation, are by some considered quite characteristic of cholera. It would seem to me from the pathology of the cyst formation that the condition has existed for a longer time than the cholera. No doubt, however, this condition is materially aggravated from the presence of cholera and the resulting congestion of the membrane and condition of the urine. Symptoms suggesting changes in the central nervous system, are usually not noticed, but when present they are in the form of convulsions, or there may be a very marked depression which might equally come from the general weakness of the body. The enlargement of some of the superficial lymph glands of the body, especially the inguinal, while not in itself characteristic, can well be mentioned as one of a chain of

symptoms. Congestion of the respiratory mucous membrane is practically always present, but is a difficult condition for which to examine. In young pigs stomatitis, especially the ulcerative or necrotic form is frequently met with in company with cholera, but it is also found in pigs that are known to be free from hog cholera, and should not be given a prominent place in the possible symptoms. Pigs with hog cholera often cough. Coughing may indicate irritation or inflammation of the respiratory mucous membrane, pneumonia, pleurisy, lung worms or stomach worms, therefore, while suggestive of cholera, is in no way positive. In the chronic cases the animals become emaciated, the abdomen is drawn up, the back arched, and the gait is usually very unsteady. In moving a bunch of pigs from the straw to the open for examination, we should always be careful not to excite them as the weaving or unsteady gait is very noticeable when the animal moves quietly, but under excitement it cannot always be detected. In those pigs that still have considerable vitality, I have often noticed a very peculiar gait, marked especially by the way they pick up their feet, the movements of the legs and the feet being short and choppy, with a slight indication of uncertainty. The squeal of a large percentage of pigs in which the disease takes on a subacute form, is a hoarse, sharp, weak cry that lacks tone and force.

LESIONS. In order to systematically discuss those pathological changes that occur in the organs of the pig as a result of the disease that we know as hog cholera, it will be necessary to understand that we use the term hog cholera to designate the disease of pigs which is caused by the filterable virus—thinking of what we know as the filterable virus as a specific morbid agent regardless of what research may ultimately demonstrate it to be morphologically or where systematic biologists may place it in the kingdom of living things.

The disease, as met in the field under natural conditions, is so frequently accompanied by various secondary or mixed infections that it is necessary to take into consideration, both in the diagnosis and prognosis, those tissue changes that result from this mixed infection. In my opinion all other forms of disease or lesions resulting from whatever cause, no matter how closely, clinically or pathologically, they may resemble cholera, unless directly or indirectly due to the action of the filterable virus, should not be con-

sidered under hog cholera; except in connection with the differential diagnosis. This, on the basis that:

Hog Cholera is a specific, infectious disease of pigs. It conforms to the generally accepted attitude towards the other specific infectious diseases of animals—to classify them according to their etiology.

In the diagnosis of the infectious fevers of pigs, we first of all look for characteristic virus lesions or by inoculation, demonstrate the virus infection. If found to be present we say hog cholera, and handle the infected herd as a virus cholera herd, regardless of the amount of secondary or mixed infection or character of the lesions.

If we fail to find characteristic virus lesions or to otherwise demonstrate its presence, we would not under any circumstances call the disease hog cholera.

Our anti-hog cholera serum is only preventive against virus cholera and that in itself, makes it almost imperative to the practitioners and those engaged in serum production to use a term that is limited in its meaning.

That form of disease due to the virus plus the secondary infection which is found in the majority of cases as met with in the field, is what has always been understood both by the veterinary profession and the stockmen of the country, as hog cholera.

It is the most prevalent, fatal, wide-spread contagious disease of pigs in this country, and is more serious and of greater economic importance than all other conditions found in pigs that clinically or otherwise resemble the results of virus infection.

At least the disease caused by the so-called filterable virus should be designated by some term, the meaning of which is limited to the action or presence of the virus.

In discussing the morbid anatomy of hog cholera, I shall take up first the lesions that occur in the tissues of the animals that are affected with the virus alone, uncomplicated. The observations that we have been able to make, and the reports from others who are working on this disease go to show that the hog cholera virus produces three general pathological changes in the tissues of the animals affected, that stand out as prominent characters of the disease. These changes are congestion, degeneration and hemorrhages. I will take up the discussion of these changes in the order mentioned.

Congestion is practically always present, to a greater or less

degree, in one or more organs of the body, but is not a very important pathological change in hog cholera, so far as the diagnosis is concerned, except possibly as found in the lymph glands of the body, mucous membrane of the eyes and the skin on the ventral surface. On post mortem examination, congestion is found to be present in a marked or mild form in the respiratory mucous membrane, the lungs and the brain and its membrane. The spleen, liver, kidneys and bladder usually show evidences of congestion, in some cases of a very mild character, while in others the organs are uniformly and extensively congested. The stomach and intestine (in some cases) may fail to show any gross evidence of congestion, while in other cases the congestion may be marked, especially in the stomach and large intestine. However, the fact that in some typical cases of cholera the intestinal mucosa is free from gross evidences of congestion, would seem to suggest that some secondary factors are necessary to make the change sufficiently extensive to be recognized on gross examination. The lymph glands, especially the submaxillary, mesenteric, inguinal and mediastinal are, as a rule, enlarged and juicy. The congestion is first noticed in the capsule showing as a bright red line, often at first confined to one portion, later extending all around the gland. It is always first evident in the connective tissue structures and in many instances presents a very striking and almost beautiful picture—the very bright blood-red lines following the capsule and trabeculae with the lighter central portion of a dull gray color. Later the whole substance of the gland may become infiltrated with blood, producing a general hemorrhage, or the hemorrhages may remain separate and distinct. In cases where the lymph glands show degeneration or supuration evidence of secondary infection is usually marked.

Congestion of the skin in hog cholera is confined to the ventral surface of the body extending down on the inner side of the legs; up the sides of the neck, nose and back of the ears.

DEGENERATION. The degeneration appears in the form of cloudy swelling or granular degeneration and is found to be most pronounced in the kidneys, liver and spleen. From the examination of a large number of kidneys, both gross and by microscopic sections, we feel safe in saying that degeneration is a marked and characteristic change as met with in the kidneys. Upon gross examination the organ is usually some what enlarged and presents the following general variations: normal in appearance, congested in

areas or uniformly, normal in color and hemorrhagic, congested and hemorrhagic, uniformly pale, so-called cooked kidney, or it may be pale and hemorrhagic, in which case the petechial hemorrhages are very plainly seen because of the contrast in colors. In some cases of chronic cholera and from pigs that seem to possess a certain degree of resistance to the virus we get an interstitial nephritis. In such cases the capsule is more or less adherent, "strips with difficulty" and the kidney is of a grayish brown color.

Upon section we find in the early stages that the tubular epithelium is swollen so that the lumen of the tubule is obscured. The cell protoplasm becomes decidedly granular, the cell membrane ruptures, the nucleus undergoes disintegration and the whole becomes a granular mass in the lumen of the tubule. All the parenchymatous structures of the kidney may be involved but the degree of degeneration shown in sections depends upon the character and duration of the disease. From our observations it would seem that the basement membrane is rarely involved and probably only when we have an interstitial nephritis, which is a secondary lesion. The so-called trachoma bodies found in the various cells of the body, especially from the eye discharges and the kidney cells, are rather constant changes, but they are also sometimes found in healthy pigs and therefore, cannot be considered characteristic of hog cholera. The degeneration of the mucosa of the intestinal tract, especially in the caecum and colon, is an important change, for while not easily demonstrated, the secondary changes that are made possible from the structural and functional disturbances that result in some cases in a complete cessation of the normal function of this membrane, thus allowing micro-organisms to multiply in the membrane itself, or pass through and be carried to other organs of the body, producing changes that are fatal even though the animal naturally or artificially overcomes the virus. The degeneration of the other parenchymatous organs of the body is a typical granular degeneration, the degree and extent of which, seems to depend upon the severity of the case and the amount of secondary infection. This is especially true of the liver and spleen.

Congestion and degeneration are changes that are characteristic of practically all our specific infectious fevers and while they are exceedingly important in our interpretation of the action and importance of the virus, when we come to make a diagnosis of hog cholera, like the inflammatory changes met with that are due to secondary infection, they serve only in a supplementary way.

The hemorrhages which are exceedingly characteristic of virus infection are what we know as petechial hemorrhages and are found in the great majority of cases to be present in the kidneys, lungs, mucous membrane of the bladder, pharynx, large intestine, lymph glands, stomach, brain and in the skin on the ventral surface of the body. The cause of the hemorrhages is the degeneration of the parenchymatous cells and structures surrounding the capillaries, increased pressure from the congestion that is present and no doubt from a direct action of the virus on the wall of the blood vessel. The visible petechial hemorrhages on the kidneys are just beneath the surface of the organs and in typical cases are readily seen, especially after removal of the capsule. Upon gross or microscopic section, they are often found in the glomeruli, throughout the cortex and medullary portions in the intestinal structures and in the pelvis. In some severe cases, our observations would indicate that the hemorrhages may be found generally distributed throughout all of the structures of the kidney. In the lungs the hemorrhages are often situated beneath the serous covering, but microscopic examination shows the finer capillaries throughout the substance of the lungs to be ruptured, allowing the blood to escape in the air sacs and alveolar spaces, and interstitial structures. Hemorrhages are often visible on the mucous surface of the bladder, large intestine and stomach, and are found to be quite frequently present in the submucosa, but so far as our observations go, are never found in the serosa of the intestine, except when secondary infection is evident in the body. The circulatory disturbances noticed in the skin, are most frequently in the form of an infiltration of blood, but a close examination will show that many of the capillaries are ruptured, and that a true hemorrhage existed. The other organs of the body do not, as a rule, upon gross examination, reveal the presence of hemorrhages, yet in some cases small hemorrhages and bloody infiltration may be found in the substance of the liver, heart, brain and possibly other organs of the body.

In young pigs, especially those under six weeks of age, we frequently find numerous petechial hemorrhages showing on the liver and heart. I feel that the hemorrhages found on the heart and liver in young pigs, are directly due to the action of the virus, while hemorrhages on the heart and its membrane and the serous surface of the intestine, in older animals is practically always due to some form of secondary infection, and it seems to me that this is

perfectly logical, not only from our pathological and histological study of the affected parts, but by taking into consideration the delicate condition of the capillaries and supporting structures in these organs of the young pig. The spleen sometimes shows sub-capsular hemorrhages, and histological examination frequently shows the substance of the organs to be generally hemorrhagic in character, dark and friable, and often showing the anemic infarcts. We do not consider the small subcapsular capillary hemorrhages to be absolutely characteristic of hog cholera, nor are the other changes in the spleen constant, yet while not constant are present in the majority of cases.

While it has become generally accepted and we feel perfectly justified in saying that the hog cholera virus alone or in itself never produces inflammatory processes, but that all inflammatory processes met with in pigs affected with the filterable virus are those due to the action of some other agent, but as the cases of hog cholera met with in the field do in the majority of cases suffer from secondary or mixed infection, and the resulting lesions being more or less constant and uniform in character, we have come to accept them as being sufficiently characteristic of hog cholera as to warrant our using them in making a diagnosis. The typical button ulcers of the cecum and colon, are good examples, but we feel that the virus in producing, first a congestion, degeneration or hemorrhage in the mucous membrane of the intestines, enable other micro-organisms to get a foot-hold, and the tissue changes that result in the formation of the typical hog cholera ulcers, is simply an inflammatory reaction of the tissues in an attempt to protect itself from the destructive action of the organisms and prevent a rupture of the intestine. At other times inflammation met with in the alimentary tract may be an acute inflammation with little or no exudation or destruction of tissue. There is more often in such cases a mucous exudate that has a sticky, greasy character, often blood stained, especially in the stomach. Again the inflammatory changes in the intestines take on the form of a diphtheritic enteritis. This may be in the ileum, cecum or colon, but is usually confined to one portion or the other in pigs of the same herd. In all such cases there is complete degeneration of the mucosa, and involvement of the whole intestinal wall in inflammatory changes. The interlobular hepatitis, intralobular multiple abscess formations so frequently found in microscopic sections, the enlarged, dark, friable spleen and the in-

terstitial nephritis, is due so far as we can determine, to a secondary infection that gains entrance to the system through the intestinal tract. The various inflammatory changes in the lung which range from a simple inflammation to a suppurative necrotic pneumonia, are due to micro-organisms whose entrance to the lungs has been made possible from the fact that the virus has so weakened the natural corporeal resistance and that of the lung itself, to those organisms that normally live on the respiratory mucous membrane or that are inhaled with the dust and dirt of the air, that the lungs are no longer able to throw them off, and through their lodgement in the substance of the lungs, they produce the various degrees of inflammation mentioned above. Atelectasis of the lungs, both natural and acquired, is rather common in the pig, and should not be mistaken for inflammatory changes.

The dark discoloration of the bone marrow which formally occupied a prominent place in the lesions of hog cholera, is found to be rather rare, especially in young pigs with an acute form of the disease, and we are inclined to feel that the changes in the bone marrow should be considered to be due largely to secondary infection, and in chronic cholera, in older animals. An anemic condition of the bone marrow which has been unofficially reported, we have failed to find. A slight or marked increase in the amount of intraperitoneal fluid is rather constant, a fibrous exudate or hemorrhages on the peritoneum is evidence of secondary infection. In the few cases where we have examined the urine from virus pigs about 60 to 75% gave a strong reaction to albumin.

DIFFERENTIAL DIAGNOSIS. In that there are many diseased conditions of pigs that more or less closely resemble in their clinical manifestations, hog cholera, it becomes necessary to take them into consideration when making a diagnosis. This is further necessary because many pigs that die of hog cholera fail to show the characteristic lesions.

Among the diseases or disease conditions that must be differentiated from hog cholera, are parasitism, a form of infectious enteritis, that condition which the U. S. Bureau of Animal Industry calls Salmonellosis and is supposed to be due to the *Bacillus suispestifer*, the so-called swine plague, pneumonia, verminous pneumonia, brine poisoning, acute pericarditis, shoat typhoid, enteritis and poisoning from spoiled foods, soap powders and irritating stock powders, swine erysipelas (which so far as we know does not

exist in this country), septicemia, malignant edema, necrotic laryngitis, anthrax, heat stroke, lightning stroke, or sudden death from any cause, and a number of acute febrile conditions, that we have met with in pigs, but so far have been unable to classify.

In the differential diagnosis of any disease we must always take into consideration the history of the affected herd, and then take those diseased conditions that it is possible to recognize, and by a process of elimination attempt to determine what one of the various diseases it might be that is causing the death of the animals. In order to do this, we must of necessity know, and be able to recognize those things that are considered specific characters of the various diseases or diseased conditions met with in pigs.

The diagnosis of hog cholera is made possible by finding in the various organs of the dead animals those lesions that are known to be characteristic of virus infection, or by inoculating a susceptible pig with the blood from a suspected case and the production of the disease. In case the suspected blood is from a pig that showed marked evidence of a mixed infection, or inflammatory changes, the blood should first be filtered. Animal inoculation is further made necessary from the fact that many of the pigs that die of hog cholera fail to show the characteristic lesions, but as it is often impossible, especially in the field, to make animal inoculation, and as we cannot always afford to wait for the result of animal inoculation, it becomes necessary for us to take into consideration and use those things that we know regarding the differential diagnosis.

In cases of parasitism, we look for the presence of the parasite, but we must know the importance of the parasites which we find and their disease producing characters.

In all forms of enteritis we must take into consideration the conditions under which the pigs have been kept, the food and the water supply, the location and character of the lesions in the alimentary tract, the changes found in other organs of the body and the general character of the lesions as a whole.

In what is apparently an infectious enteritis in which emaciation is the characteristic symptom and enteritis and atrophy of the liver the principle gross tissue changes.

If we admit that there is a specific infectious disease of pigs known as swine plague caused by the *Bacillus suisepcticus*, then we must demonstrate the presence of the specific organism.

In verminous pneumonia, we will find the *Strongylus paradoxus*.

In all of the forms of inflammation of the lungs, we must be guided by the history of the disease, number of animals affected and the general character of the lesions.

In brine poisoning we practically always can get a history that the animal had access to large quantities of salt. I wish to emphasize this because I personally know that there are many so-called stock foods on the market that contain sufficient quantities of salt, that when left constantly before the animals in solution will produce acute brine poisoning, and we know of a number of cases where a farmer has emptied his pork or beef barrels where the animals had access to it, that resulted in their death.

Poisoning from various causes has been demonstrated a number of times in this country, and we must depend upon the history together with the absence of any specific infection.

In anthrax and malignant edema, we would look for characteristic lesions and the specific cause.

In general septicemia the post mortem findings, together with the history will usually enable us to make a diagnosis.

In necrotic laryngitis the symptoms and lesions are usually sufficiently pronounced to enable us to recognize the condition.

In order to intelligently carry out all the steps that come in in the process of making a differential diagnosis, a man must first be more or less familiar with the predominating features of the various conditions that may be met with in pigs. He must be familiar with the disease in the community in which he is working and be able from the observations and things that he finds at the time of the examination to reason out for himself those things that are necessary to confirm the diagnosis.

In our discussions on the pathology of hog cholera, we attempted to emphasize the fact that the three main pathological changes that occur in pigs as a result of infection with the so-called hog cholera virus are congestion, degeneration and hemorrhages.

If we wish to make a diagnosis from the gross changes found upon post mortem examination, we should look for congestion in the lymph glands, spleen, stomach and intestine, respiratory mucous membrane, mucosa of the bladder and the brain and its membrane.

The degenerative changes which may be found will be a cloudy swelling of the kidneys, such kidneys are usually very pale in color and the organ may or may not show hemorrhages. The degenerative changes found in the other parenchymatous organs of the body

can usually not be detected with certainty upon gross examination. The formation of small or large ulcers in the intestine, especially in the cecum and colon are considered characteristic of cholera, especially the so-called button ulcers. A general diphtheritic inflammation of the small and large intestines does not necessarily come from cholera infection. The degenerative changes met with in the lungs are often found in simple cases of pneumonia and can in no way be considered typical of cholera; however, we should not overlook the fact that during the fall and winter, pneumonia more often accompanies cholera than it does in the late spring and summer.

The typical petechial hemorrhages of hog cholera are found just beneath the pleural covering of the lung, in the kidneys, in the mucosa of the bladder, cecum and colon, sometimes in the stomach, and the mucous membrane of the pharynx. The spleen and lymph glands are often hemorrhagic and the connective tissue structures of the brain frequently show hemorrhagic infiltration. In young pigs of three, six or eight weeks of age, the liver sometimes shows numerous small hemorrhages, but we seldom find these in older animals. In a few cases where we have found petechial hemorrhages on the heart and its membrane there has always been marked evidences of secondary infection. If one is to make a diagnosis of hog cholera from the gross findings at the time of autopsy, I feel that he should find at least two lesions that are considered typical of hog cholera, but that one should be careful in using for diagnosis lesions that may result from a great variety of causes. We consider numerous small hemorrhages on the lungs, kidneys and mucosa of the bladder as characteristic hemorrhages from hog cholera. Any one of these with involvement of the lymph glands or formation of ulcers in the intestines are sufficient to make a diagnosis of hog cholera. Experience has shown that after having made a diagnosis of hog cholera, that one should be very careful to estimate the general condition of the herd and the form of cholera, and especially the degenerative changes, such as pneumonia and ulcers of the intestine, largely due to secondary infection as such animals often fail to show sufficient temperature to exclude them from vaccination, yet the lesions may be of such an advanced character that should they overcome the action of the virus the animals would die from other causes.

THE ETIOLOGY OF HOG CHOLERA

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Although the specific cause of hog cholera has not been seen or cultivated in cultures, much is known concerning its nature and attributes.

DISTRIBUTION OF THE VIRUS. So far as known the virus of hog cholera exists only in the tissues and excretions of infected hogs and in substances which may have been directly or indirectly contaminated. There is no evidence that the virus has the power to propagate itself outside of the tissues of swine. In infected swine the virus is present in the circulating blood and lymph, in all the organs, muscles and vascular tissues of the bones. It may escape from the body in the urine, feces, saliva, nasal and laryngeal secretions and from pustules of the skin.

FILTERABILITY OF THE VIRUS. The blood, tissue juices and excretions of infected hogs are capable of transmitting the disease, even after having passed through filters which remove all known bacteria. The resulting filtrate may be free from living organisms so far as our present cultural and microscopic methods can determine and still be capable of producing hog cholera when administered to susceptible animals.^{5 9 12 55} The virus of hog cholera is evidently corpuscular in nature since it will not pass through the finest Kitisato filters, although when diluted it is not retained by the porcelain Pasteur-Chamberland filter candles F and B.³⁹ The virus will pass even more readily through the Bergefeld filter. However, this kind of filter may occasionally permit *Bacillus suispestifer* and other bacteria to pass.^{35 36} In all filtering the pores of the candles usually become more or less clogged and finally the passage of the disease producing virus may be completely prevented. To obviate this as much as possible blood virus should be diluted before filtering, at least 1 to 10, and it is better to begin with coarse filtration through sand, filter paper, infusorial earth and asbestos. In filtering hog cholera virus through fine porcelain filters, its potency per volume is weakened so that a larger dose of filtered virus is required to produce acute hog cholera. Evidently something is removed which has considerable to do with producing hog cholera. Undoubtedly much of the potent virus material is retained in the substance of the filter. It has been observed that the protective

power of anti-hog-cholera serum is greater against filtered than unfiltered virus. This weakening by filtration is supposed by some to be due to the removal of bacteria which, as a secondary cause, may act as an adjuvant to the filterable virus.

PROPAGATION OF VIRUS. So far as we know, the only method for the propagation of virus is by the infection of swine. This is accomplished through the exposure of susceptible swine by inoculation, the feeding of virus, by the infection produced in susceptible swine, by placing them in infected feed lots or exposure pens and by association with infected hogs. Subcutaneous injections of $\frac{1}{2}$ c. c. or more of defibrinated filtered or unfiltered blood, usually produce hog cholera after an incubation of 5 to 14 days. In some instances the period of incubation may be even more prolonged. Swine are the only domesticated animals that are susceptible to hog cholera and numerous attempts to propagate the virus by the inoculation of horses and other animals have failed.

The attempted cultivation of the virus by the use of artificial media has thus far failed.⁵¹ The statement of Pfeiler and Lentz¹⁸ who claimed its apparently successful cultivation has not been substantiated. The propagation of the virus on a cheap medium would be of enormous economic importance in the preparation of immune serum and, in view of the reported successful cultivation of the filterable virus of rinderpest by Boynton, efforts along this line would seem worth trying with hog cholera.

Efforts to concentrate the virus by centrifugalization or by prolonged standing and sedimentation have failed to produce practical results. When defibrinated blood is centrifuged and the resulting sedimented corpuscles repeatedly washed until free from serum, they have been found to be rich in virus. This, however, is probably in part due to the adhesion of the virus to the corpuscles, since it has been demonstrated that the same results can be obtained by adding sheep or rabbit corpuscles to corpuscle-free hog virus and centrifuging. With the use of agar coated filters or other colloid filters, the virus is retained and is deposited to a certain extent in the outer layers of the medium.^{2 30}

By injecting physiological salt solution in the proportion of about 25 c. c. per pound of body weight into the abdominal cavity of infected pigs, five to seven hours before they are to be killed for virus, and drawing off what is unabsorbed after the animal has been bled, a fluid rich in virus may be obtained. Certain manufac-

turers of serum have successfully used this salt solution virus for hyperimmunizing purposes.^{7 51}

Although the preparation of virus for hyperimmunizing purposes has been limited to the use of blood and salt solution already mentioned, virulent material for experimental purposes has been prepared from infected tissues by macerating the ground-up organs in an equal weight of physiological salt solution after which the liquid is pressed out and filtered.

The urine of infected hogs is rich in virus and although unsuited for hyperimmunizing may be utilized for infection experiments. It is more easily filtered than blood serum.

The bile of infected hogs contains the virus but can only be filtered in a very diluted condition.

The feces contain a relatively small amount of virus. This is probably due to the destruction of the filterable virus by the products of fermentive and putrefactive bacteria in the intestinal tract.^{55 56 57}

VIRULENCE OF THE VIRUS. It is a matter of common knowledge with those who have tested hog cholera virus in connection with serum manufacture that there is great variation in the course of hog cholera in pigs following the injection of virulent blood. Doubtless in many instances this is due to variations in the individual resistance of the pigs inoculated. Variation in virulence, however, seems to be a marked characteristic of the filterable viruses. In rabies it has been possible by repeated inoculations to enhance the pathogenic power for rabbits to a maximum at which it remains fixed and constant. Attempts to accomplish this with hog cholera virus, although attended with some increase in virulence, and the establishment of a so-called fixed strain,⁵⁰ have not resulted in a standard fixed virus for hog cholera which is at all comparable to the fixed virus of rabies.^{23 39 57}

It has been demonstrated that hog cholera serum made from one strain of virus will protect against other strains of virus. However, there is reason to believe that serum made from a virus of low potency is less efficient than that made from strains of high virulence. The variation in virulence of epidemics in various parts of the country can be accounted for largely as a direct variation in the virulence of the filterable virus. Craig⁷ states that strains of virus of low potency can be enhanced in virulence by passage through 2 to 6 weeks old pigs from susceptible mothers. One of

the strongest theoretical arguments against the simultaneous method is that the distribution of highly potent laboratory virus tends to keep hog cholera infection enhanced to its highest point of virulence. Hog cholera epidemics diminish in virulence when new virus is not introduced, but there is a difference of opinion among authorities concerning the use of virus and the restrictions which are desirable in connection with its field use as an immune agent. The view held by some pathologists is that pure uncomplicated hog cholera is itself a relatively mild disease which derives its malignancy from the bacterial infections which follow in the wake of the primary infection with the true filterable virus of the disease. The claim of Dinwiddie¹¹ that certain strains of cholera virus, even when bacilli are absent from the injected blood, seem to quite generally beget bacillary infection by inoculation and that the same effect is produced by exposure infection with these strains. When unfiltered virus is used there is always the possibility of the presence of pathogenic bacteria. The practice of drawing the virus blood in the early stages of the disease and its preservation with 1% phenol, does much to eliminate bacterial contamination.

A little data concerning the comparative virulence of various strains of filtered bacteria-free hog cholera virus is available. The minimum fatal dose has not been determined and doubtless the virulence of the virus, even when so-called fixed strains are used, is so variable that it would be impossible to determine the fixed minimum.

ACTION OF THE VIRUS IN VIVO. Lacking definite knowledge of the specific pathogenic organism causing hog cholera, the method of its harmful action on the body cannot be definitely determined. It is now generally supposed that the filterable virus weakens the resisting powers of the body, and that semi-pathogenic bacteria, particularly those of the colon, paracolon, typhoid groups invade the tissues and render the disease more malignant. A description of the pathological changes produced is given by Dimock in another section of this report. The virus is harmless for all domesticated animals except swine. The injection of considerable quantities of virulent blood into horses produces some reaction. It is probable that soluble toxins do not play a very important part in the action of the virus.

The action of the virus on the endothelial cells is evidenced by the characteristic petechial hemorrhages throughout the body. The

skin lesions are doubtless indications of a trophic affinity of the invisible organism or its products for the epithelial cells. The purulent conjunctivitis and the peculiar cell inclusions which we describe later in the conjunctival epithelial cells are perhaps manifestations of a specific action on these tissues. In most of the lesions of hog cholera, particularly those of an extensive character, doubtless secondary bacterial infection plays the most important part, but the primary injury at the points where the lesions form is probably due directly to the virus. As to just how this injury occurs is at present a matter of surmise.

Infection with the filterable virus of rabies, variola, epithelioma contagiosum, and trachoma is accompanied by intracellular changes in certain groups of cells and the presence of inclusions similar to those of trachoma in the conjunctival cells of hogs infected with cholera is probably of significance as an indication of the affinity of the virus for such cells.

CHLAMYDOZOA OR STRYNGOPLASMA.³⁴¹⁹ In the conjunctival epithelial cells of most swine infected with hog cholera, cell inclusions of very significant and interesting character have been demonstrated. The presence of these intracellular bodies is not necessarily confined to the animals which show the purulent conjunctivitis often associated with hog cholera. Although the percentage in non-infected animals is very small, (3%, according to Uhlenhuth) in infected animals the inclusions are usually present. As has already been mentioned, the cellular inclusions resemble the so-called chlamydozoa or stryngoplasma present in trachoma of man, and which Noguchi¹¹ claims to have cultivated *in vitro*. The bodies are readily demonstrated in smear and impression preparations from the conjunctiva of hogs as soon as they become visibly sick. When stained by Guinsa's method they appear as granular masses of a deep purple color inside the cytoplasm of the conjunctival epithelial cells. These bodies occasionally rival in size the nucleus of the cell, but are usually smaller and consist of large numbers of very small, deeply stained granules. As yet the exact significance of these bodies and their relation to hog cholera has not been established.

In addition to the similarity of these bodies to the cell inclusions found in trachoma it is noteworthy that in epithelioma contagiosum and vaccina, similar bodies are present in the proliferating ectodermal cells, while there are certain resemblances to the Negri

bodies in rabies which are present in the nerve tissue of rabid animals. All diseases in which chlamydozoa and similar bodies have been demonstrated are believed to be due to filterable viruses. In none of these have the actual germs of the diseases been positively demonstrated. We are inclined to attribute these cell inclusions to protoplasmic changes due to selective action of the virus for those particular cells. That is in accordance with the evidence from the lesions that the filterable virus of hog cholera has a selective and destructive action for the endothelial and epithelial cells.

CONCERNING THE VIRUS IN VITRO. The time that the specific organisms of hog cholera will live outside their natural host depends upon the effect of the physical and chemical influences to which they are subjected. There is abundant circumstantial evidence that the virus under favorable natural conditions may live for over a year in infected wallows and pig sties. On the other hand, we know that it is quickly destroyed in putrefying material and susceptible animals have been placed in previously infected pens after a lapse of three months without contracting the disease. It is well known that under laboratory conditions, virus may sometimes be kept for months without a diminution in virulence. It frequently occurs, however, that in a few days originally virulent blood will weaken and occasionally even lose its pathogenic power entirely. The cause of this has not been satisfactorily explained. It has been observed that the virus retains its virulence longer in filtered bacteria-free serum than in filtered urine.

THE EFFECT OF TEMPERATURE. *Heat* is an effective agent for the destruction of hog cholera infection. The virus is relatively more resistant to both moist and dry heat than the vegetative forms of most bacteria, but not so resistant as the spores of anthrax and similar organisms.

The effect of heat on virus is illustrated by the following table prepared from the published experiments of the German Imperial Board of Health Laboratories.^{55 56 57}

MATERIAL	Temperature degrees centigrade	TIME	RESULT
Liquid serum filtrate	45	24 hours	Not killed nor weakened
Liquid serum filtrate	46.5	24 hours	Not killed nor weakened
Liquid serum filtrate	46	48 hours	Killed
Liquid serum filtrate	55	24 hours	Killed
Liquid serum filtrate	60	10 hours	Killed
Liquid serum filtrate	58	2 hours	Not killed
Liquid serum filtrate	78	1 hour	Killed
Dried blood	65	2 hours	Not Killed
Dried blood	72	1 hour	Killed
Dried blood	72	1½ hour	Killed
Urine	58	1 hour	Killed
Urine	58	40 minutes	Not killed

Cold does not seem to have any effect, although so far as we know no experiments have been made on temperatures below zero Fahrenheit. The spread of the disease usually abates during the extremely cold weather in the northwest central states, but begins again with the spring thaw. In the Imperial Valley, California, relatively few cases of cholera occur during the three hottest months when the temperature ranges from 70 to 115°F., but losses begin to increase with the advent of cool weather.

Drying at a temperature of 37° C. does not impair the potency

Sunlight seems to have very little effect even by direct action. Virulent serum filtrate exposed 9 hours to direct sunlight remained fully virulent to experimental animals.

PUTREFACTION. The virus is known to be relatively sensitive to the effects of putrefactive organisms. Carefully controlled experiments have proven that the virus is destroyed in decomposing meat in a few days. The virus in old putrefied organs loses its virulence in eight days. Giltner reports, however, the persistence of virus in putrid pork for one year. Virus containing urine to which hog manure was added to hasten decay, lost its virulence in 24 hours when kept at a temperature of 22°C. Virulent filtered serum, when mixed with non-sterile blood and urine, lost its disease producing power in 5 days. The same virus filtered twice and kept sterile at room temperature was still fully virulent at the end of five days. Virulent blood preserved with 0.5% to 1% carbolic acid often retains its virulence for several weeks while the same blood, without preservative loses its virulence as soon as it begins to de-

compose. The fact that the virus will persist longer in diluted filtered serum than in decomposing blood may explain why contaminated water is such a frequent source of infection, for it would appear that the virus will survive more readily in water than in decomposing organic matter.

DISINFECTANTS. On account of the resistance of the virus to chemicals it would seem that dependence should not be placed on the use of disinfectants in the dilutions which are usually used to kill pathogenic bacteria. Even when the 3% solution of lysol or compound solution of cresol is used, as recommended by the Bureau of Animal Industry, it should be borne in mind that an application for over 1 hour is necessary to kill the virus. Müller⁴⁹ states that even in pens built of iron and concrete the destruction of the virus is so difficult that after the disinfection of infected pens, immediate restocking with susceptible swine is usually followed by losses from hog cholera.

It is recommended that the application of 6 per cent. cresol soap solution or calcium chloride be used to disinfect pig sties.

The following table compiled from the results of experiments published by the German Imperial Board of Health Laboratories^{55, 56, 57} shows the resisting power of hog cholera virus to disinfectants. As a rule the tests were made by mixing 10 c. c. of virus with an equal amount of aqueous dilution of the disinfectant.

BACTERIA ASSOCIATED WITH HOG CHOLERA INFECTION. Infection with the virus of hog cholera is usually followed by the invasion of the tissues with certain species of bacteria. The presence of these bacteria greatly complicates the problems of the investigator who attempts to explain the pathological changes which occur in hog cholera. Some authorities hold that several species of bacteria which are frequently associated with hog cholera are occasionally the cause of epidemic disease in swine without the presence of a filterable virus. This belief, however, appears to be losing ground in the United States, although it is still generally held that *B. suis-pestifer**, *B. suis-susceptus* and possibly other organisms are the occasional cause of sporadic disease.

BACTERIA OF THE COLON TYPHOID GROUPS*. The *Bacillus suis-pestifer* (*B. cholera suis*) first described in 1885 by Salmon and

* For description of the morphological and biochemic characteristics of these bacteria, the reader should consult any complete veterinary bacteriology,—only the important points relating to their association with hog cholera virus are mentioned here.

Table Showing the Effect of Disinfectants on Hog Cholera Virus

Smith was for many years believed to be the specific cause of hog cholera. The view at present seems to be that this organism is responsible for certain lesions in pigs, but that it is not the cause of epizootic hog cholera. Authorities differ as to the importance which they attribute to this organism as a cause of disease in swine. The organism is frequently present in the circulating blood of swine infected with the filterable virus of hog cholera, but in many cases it has been found impossible to demonstrate its presence.^{4 57} *Bacillus suispestifer* and similar strains have been isolated from the intestines of healthy swine in herds where no epidemic existed. It should be noted, however, that when such strains have been tested as to their pathogenic power, when given by the mouth to pigs the results have been negative.⁵⁷

It has been demonstrated that *B. suispestifer* when fed or when injected intravenously may produce a diseased condition indistinguishable from hog cholera except by the absence of the filterable virus and the lack of transmissibility by association. Under certain conditions it is probable that these organisms may become enhanced in virulence or the resistance of the animal may be reduced and infection result even when the infection with filterable virus is absent. Contrary to the infection produced by the filterable virus hogs, which are infected with pure cultures of the *Bacillus suispestifer* do not transmit the disease to healthy hogs and if they recover they continue to be susceptible to natural infection.¹² By feeding quantities of cultures, inflammatory and necrotic processes develop on the mucous membranes and sometimes congestion and caseation of lymph glands. Subcutaneous injections are not so liable to be fatal.

BACILLUS TYPHI SUIIS AND BACILLUS VOLDAGSEN. In Germany considerable pathogenic importance is attributed to certain strains of the Paratyphoid B. group, particularly *B. typhi suis* which has been isolated from young swine showing lesions of caseous enteritis.^{8 14 45 55} The advocates of the claim that this particular organism is of great pathogenic significance and the specific cause of a pig typhoid apart from its association with true hog cholera have been unable to convince all of their colleagues.^{9 20} Some leading German authorities assert that these organisms are fundamentally only a variety of *B. suispestifer*.²⁹ The recent isolation of *B. typhi suis* from the mouths of sound pigs in healthy herds as a further victory for those who have consistently held that the filterable virus of

hog cholera is at the root of so-called pig typhoid infections.³³ Lesions resembling those described as found in *voldagsen* and *typhi suis* infections have been found in pigs in California. In one instance a herd of several thousand hogs has been under observation by Hayes for a year, during which time several hundred pigs of weaning age have become so affected. No evidence of cholera in any form was established even though many autopsies have been held and infection experiments carried out. The symptoms in these pigs might easily be mistaken for hog cholera. Traum has isolated *B. suispestifer* but efforts to find *B. typhi suis* have thus far failed. The predisposing causes in this outbreak of diphtheritic caseous enteritis are attributed to congenital weakness and malnutrition.

BACILLUS COLI COMMUNIS. A variety of strains of this well known saprophytic and semipathogenic inhabitant of the intestinal tract have been isolated from the circulation of swine infected with hog cholera.

No one questions its pathogenic significance as a secondary invader or that its presence like that of its cousin *B. suispestifer* may increase the malignancy of the disease so far as the particular individual infected is concerned.

BACILLUS SUISEPTICUS (BACTERIUM SUISEPTICUM, BACILLUS OF SWINE PLAGUE). In those cases of hog cholera having pulmonary lesions this organism is especially liable to be present. It has been repeatedly demonstrated in the air passages of healthy swine and until the discovery of the filterable hog cholera virus was considered to be the primary cause of swine plague. It is the consensus of opinion in America at the present time that the majority of outbreaks of so-called swine plague are primarily due to the hog cholera virus, the *Bacillus suissepticus* being a secondary invader. In fact it has been demonstrated that the presence of this particular species of bacteria is not essential to the development of advanced lung lesions in hog cholera. The filterable virus alone probably never produces extensive hepatization or purulent inflammation in the tissues, but when associated with *Bacterium pyogenes suis* or other semipathogenic bacteria present in the open passages as well as with *Bacillus suissepticus*, may cause pneumonia. The virulence of various strains of this bipolar bacillus varies within very wide limits and changes very rapidly even in cultures of the same strain. It is possible that extensive outbreaks of pure swine plague

do occur, although so far as we know this has never been positively demonstrated by filtration experiments. The writer has observed one instance of epidemic pneumonia in some large herds of swine in which anti-hog-cholera serum failed, but which later yielded to sanitary and isolation measures. In Germany pure swine plague (Schweineseuche) is still considered an important disease often distinct from hog cholera.

SPIROCHAETA HYOS (*SPIROCHAETA SUIS*) an organism found in the intestinal ulcers, crypts in the ceca, and external local lesions of animals infected with hog cholera is believed by King to be more nearly established as the specific cause of hog cholera than any other known organism.^{30 31 32} He reports having cultivated this organism in pure culture. This spirochaete appears to be capable of breaking up into granules which have the power of passing through bacteria-proof filters. The organism including the granular forms which pass through the filters are capable of producing sickness typical of hog cholera. The spirochaetes, however, being demonstrable only in the intestinal or local external lesions. Until more data is available the question of the relation of spirochaetes to hog cholera remains open.

The fact that sodium taurocholate quickly destroys most spirochaetes, but has no effect in the filterable virus of hog cholera, is presumptive evidence that *Spirochaeta suis* is not the specific cause of hog cholera.³⁹

BACILLUS NECROPHORUS. This organism is frequently the primary cause of serious necrotic inflammations in swine, particularly in suckling pigs, in which it causes skin infections and sores in the mouth. The filterable virus of hog cholera produces favorable conditions in the tissues for the development of this species of infection. *B. necrophorus* has been demonstrated in button ulcers which at one time were thought to be especially typical of hog cholera.¹

OTHER BACTERIA. The presence of bacteria of various kinds in the lesions and circulation of virus infected hogs should be considered as a natural result of the injury to the tissues, particularly the endothelial cells by the virus, furnishing portals of entry for all kinds of bacteria which, on account of the lowered resisting power of the body, may spread in the tissues and circulation. In affected hogs Uhlenhuth found *B. suispestifer* in 76 cases, *B. paratyphoid A* in 3 cases, *B. enteritidis* (Gaertner) in 1 case, *B. pyocyaneus* in 50 cases, streptococci in 36 cases, staphylococci in 27 cases and *B. coli* in 110 cases. In 14 cases the organs were sterile.

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THE CONTROL OF HOG CHOLERA

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An outline of the definite measures which should be taken to prevent hog cholera is given in the section of this committee's report on prevention. It remains, however, to mention the forces available for aid in this work and describe the schemes of organization by which these measures may be executed.

It is evident of course that no progress can be made in the exceedingly difficult task of enforcing a preventive measure without an intelligent public interest, confidence and support. Therefore, organized efforts along educational lines are the first steps to be considered. The following resolutions adopted at a conference of federal and state officials in Chicago on March 3d, 1914, express the consensus of opinion of our committee:

"We regard Hog Cholera as one of the greatest questions before the public at this time. The disease has been prevalent many years, with losses fluctuating between wide limits. The heaviest losses, as shown by the best available data, were 120 and 130 hogs per thousand in 1887 and 1897, respectively. The estimates for 1913 are 100 loss per thousand, and the indications are that the disease is passing through another period of rapid increase. In view of the high cost of living, such enormous losses of a valued food product must be regarded as a calamity.

"The main problem at this time is to control the disease. With progress now being made, both in science and practice, it may be expected that the question of eradication will come up later; but, unquestionably, the matter of control will be uppermost for years to come.

“For success, the first requirement is an honest and earnest purpose to co-operate as between all the interests involved, especially the scientist, the veterinary profession, farmers, common carriers, and packing interests.

“The control and final eradication of hog cholera will depend largely upon the education of farmers to the importance of observing sanitary principles.

“The serum alone treatment may be given by anyone without danger of causing cholera. Such harm as follows this treatment is due mostly to ignorance in the use of serum or of sanitation. While it is preferable to have serum used only by competent veterinarians, it is not deemed advisable to require that layman may not use serum alone.

“The closest possible supervision of the manufacture and distribution of serum should be provided, to assure its purity and potency. It is believed that this should be in charge of federal authorities in such plants as may properly come under their supervision, and provision should be made in the different states to duplicate and supplement the federal efforts along this line.

“It is desirable for the states to manufacture serum, but neither by the size of the plant nor by the price of the product, should this effort be monopolized by the states.

“The simultaneous treatment should be used only by those who have had special training. The ideal arrangement would be to allow its use only by federal and state veterinary officers. Other officers who have sufficient training in the use of virus, and in sanitation, may use the simultaneous treatment with safety. Where it is not possible to restrict virus to official hands because of shortage of funds or lack of officers, or for other uncontrollable reason, it should then be used only by such other persons as have been given a special permit after receiving special instruction, which is as thorough and detailed as feasible, and who show that they understand the essential fundamental principles. But in any such case, the unofficial layman should be permitted to use virus only in his own herd, and then only if the district is already infected.

“The manufacture, distribution and use of virus should be rigidly supervised by federal and state authorities.

“Quarantine and sanitary measures should be much more actively emphasized and enforced. Especially, it is important that freight cars which have carried infected stock shall be promptly disinfected after unloading, and infected premises should be rigidly quarantined.

“The prevailing practice of rushing sick herds to market should be discouraged in every way possible, and in lieu of such disposal

of sick herds, the owners and other persons concerned should be advised and encouraged to treat them with anti-hog-cholera serum.

“The promulgation and enforcement of all live stock sanitary regulations and other measures incident to quarantine should remain invested in the live stock sanitary boards and state veterinarians of the various states.

“Progress in combating hog cholera is being made. Special credit is due to individual efforts on the part of veterinarians and farmers. The intelligent interest of county agricultural agents is commended, and it is believed that these agents should give chief attention to assisting farmers to secure the aid of competent veterinarians, and when that is not possible, they should assist the farmers themselves to take proper remedial measures always emphasizing the importance of sanitation. There is recommended the temporary assignment of a competent veterinarian by the state government, independently or in co-operation with the federal government, to any district where difficulties on account of hog cholera are most acute, his services to be available to farmers without cost, for the purpose of demonstrating the best methods in different communities.

“Work of the highest character is being done by the United States Bureau of Animal Industry, which Bureau brought out the serum treatment for hog cholera, a treatment which has been adopted in most states and countries where the disease exists. We acknowledge with appreciation the action of Congress, whereby far more liberal provision than ever before has been made to investigate and combat the ravages of hog cholera. Similar provision has been made in several states, but the legislatures are urged to make more liberal appropriations of this character.

“There should be the closest co-operation between state and federal authorities, and all persons concerned should be willing to suppress their own opinions on relatively unimportant matters, and follow the lead of federal authorities in the interest of the adoption of uniform methods throughout the entire country.”

The following policy of the U. S. Department of Agriculture in regard to handling their hog cholera work was adopted in March, 1914:

MEMORANDUM

POLICY IN REGARD TO HANDLING THE HOG CHOLERA WORK UNDER THE ACT APPROVED FEBRUARY 23, 1914.

1st. There will be established three major projects, as follows:

- (a) Experiment to demonstrate the practicability of eradicating hog cholera from selected sections of the country.

A definite area (one county) will be selected in each of about fifteen states. An attempt will be made to control or eradicate hog cholera from these areas. The Department of Agriculture will place qualified inspectors with assistants in these areas and will furnish the serum required for the work. The states will be expected to co-operate by carrying on the needed educational work and survey, and by enforcing the necessary quarantine and sanitary regulations.

- (b) Supervision of private, and, where necessary, state serum plants, so as to protect farmers against the use of spurious and dangerous serums.

This project will be carried out entirely by the Department of Agriculture, and will consist in inspection of serum and virus plants doing business, the issuance of licenses to qualified establishments, the supervision of serum production in licensed establishments, the examination and testing of samples of serum and virus shipped interstate or offered for importation, and the collection of evidence bearing upon violations of the law under which this project is established.

- (c) Demonstrational and educational work among farmers in co-operation with the states in order to bring about a better understanding of the disease and approved methods of combating it.

This, as the name indicates, is a demonstrational project and will be conducted along lines similar to those developed by the Bureau of Plant Industry in its farm demonstration and county advisory work; the organization of clubs for educational, demonstrational and other work in the prevention of hog cholera, co-operating with the Division of Animal Husbandry, the Farmers' Co-operative Demonstration Work, and the Office of Farm Management in their field; the utilization of county advisers and farm demonstrators in educational and propaganda work in methods of preventing hog cholera through sanitary and quarantine measures and the use of serum. The fundamental idea to be carried out in this project is to demonstrate to farmers how they may, by their own effort, reduce losses from hog cholera.

2nd. The President or Dean of the Agricultural College within the State, the Commissioner of Agriculture of the State, the State Live Stock Sanitary Board, or other recognized authority charged with the administration of hog cholera work within the state, is to

be recognized as the agency through which all co-operative work will be handled. The co-operating state authority, as indicated above, is to act as a clearing house for all organizations co-operating with the Department of Agriculture under project. This plan is adopted merely to simplify and facilitate co-operation for it seems desirable, if not essential, for the Department of Agriculture to deal with one particular authority whose function will be to bring into harmonious accord the various state organizations engaged in the co-operative work. This plan is in conformity with the principle laid down in the Lever Bill which has just passed both houses of Congress and which has met with wide-spread approval everywhere.

3rd. The President or Dean of the Agricultural College within the State, the the Commissioner of Agriculture of the State, the State Live Stock Sanitary Board, or other recognized authority charged with the administration of hog cholera work within the state, will select the county or counties in the respective states where the work is to be done under project (a) with the understanding that the selections are to be approved by the Secretary of Agriculture. This is the procedure now followed in the selection of county advisers and is believed to be necessary. The localities in which the work under project (c) is to be carried on will be selected in the same manner.

The following Constitution and By-Laws for County Organization express our ideas on local organization:

CONSTITUTION AND BY-LAWS OF THE FARM BUREAU SWINE BREEDERS' ASSOCIATION.

PREAMBLE.

In order to promote swine husbandry in.....county, co-operation in marketing swine and assisting in the control and final eradication of hog cholera, and to encourage the raising of greater numbers of superior grades of swine, we, the undersigned, do, under the auspices of the.....County Farm Bureau, form a permanent association with the following Constitution and By-Laws:

ARTICLE I. NAME.

The name of this organization shall be theFarm Bureau Swine Breeders' Association. It shall be abbreviated as follows: F. B. Swine Breeders' Association.

ARTICLE II. OBJECT.

The object of the association shall be to promote the swine raising industry, to co-operate with the U. S. Department of Agri-

culture, the local authorities, state authorities and the University of California, and members of this association in the control and final eradication of hog cholera in this county, the ethics of the association and prosecution of violators of any county ordinance or state law enacted for the protection of hogs against disease, and to promote co-operative buying and marketing in connection with the swine industry.

ARTICLE III. MEMBERSHIP.

Any member of the.....County Farm Bureau owning or interested in swine, or pork production, may become a member of this association by agreeing to the constitution, signing a membership card and by paying an annual membership fee of one dollar, and such other dues as may be regularly assessed.

MEMBERSHIP CARD

.....Farm Bureau Swine Breeders' Association.

I do hereby agree to work in co-operation with the.....County Farm Bureau and the officers of this association to promote swine industry and to prevent the spread of hog cholera.

I will obey all rules and regulations prescribed by the organization and co-operate with the work in every way possible.

I hereby agree to notify the County Live Stock Inspector and Farm Adviser, and through them the State Veterinarian, and if any of my hogs are sick from any cause, whether known to me, or unknown, and if I hear of my neighbor's swine being affected with any disease, I will report at once to the County Live Stock Inspector and the Farm Adviser.

Should I ship any swine into.....County I will abide by the local ordinance in relation to movements of swine.

Signed.....

ARTICLE IV. OFFICERS AND DUTIES.

Sec. 1. The administration of the affairs of this association shall be vested in the following officers: A President, Vice-President and Secretary-Treasurer, and Executive Committee of five members. The President and Secretary shall be ex-officio members of the Executive Committee and shall constitute two of the five members.

Sec. 2. The term of office for all officers shall be for one year.

Sec. 3. All officers shall be elected at the regular annual meeting, except the executive committee, which shall be appointed by the president.

Sec. 4. At all elections a majority of votes shall be necessary to elect. Votes shall be taken by ballot.

Sec. 5. Each officer shall be entitled to one vote.

Sec. 6. The President shall preside at all meetings of the association, appoint all standing committees and perform all other duties not otherwise specified.

Sec. 7. The Vice-President shall perform the duties of the President in his absence.

Sec. 8. The Executive Committee shall within two weeks after the election appoint the members of the Board of Control and allot to each member appointed a district of which said member is a resident.

Sec. 9. It shall be the duty of each and every member of the Board of Control to be familiar with all conditions existing within their respective districts, and to report the same to the County Farm Adviser once every month, or as much oftener as a new outbreak of cholera occurs.

Sec. 10. The time and place of holding the annual meeting of this association shall be permanently fixed by the members of the executive committee.

ARTICLE V. VACANCIES.

The officers shall have the power to fill all vacancies.

ARTICLE VI. MEETINGS.

Sec. 1. The association shall hold a regular annual meeting during the Spring, the date and place to be set by the officers and announced at least two weeks prior to the time of meeting.

Sec. 2. The officers shall hold a monthly meeting in the office of the Farm Adviser, or (Sec. 2) the officers shall meet on call of the president.

Sec. 3. It shall be the duty of the president to call special meetings of the association at the request of a majority of the officers, and notice of same shall be given in advance.

Sec. 4. Special meetings may be called at any time and place within the county of by the president and secretary, or by three members of the executive committee.

Sec. 5. Business of any nature relating to the promotion of the plans and purposes of the association may be transacted at any meeting of the association, either annual or special, except the election of officers.

ARTICLE VII. COMMITTEES.

The committees shall be appointed by the executive committee. The number of committees and number of persons on each committee to be regulated by the character of the work to be done. Committeemen shall serve for a term of one year, or for a length of time specified at the time of their appointment. Their duties shall be outlined at the time of their appointment. The Farm Adviser shall be ex-officio on all committees.

ARTICLE VIII. AMENDMENTS.

This constitution may be amended by a two-thirds vote of the members present at any regular or special meeting. Notice of such amendment must be given at least two weeks in advance.

ARTICLE IX. ORDER OF BUSINESS.

The following shall be the order of business at all regular meetings of the association and officers:

1. Call to order by the president.
2. Reading of minutes of previous meeting.
3. Report of committees.
4. Unfinished business.
5. New business.
6. Adjournment.

ARTICLE X. EXACTING CLAUSE.

Sec. 1. This constitution shall be in effect on and after its adoption.

Sec. 2. All officers elected at the time this constitution is adopted shall hold office only until the next annual meeting.

BY-LAWS.

1. A member shall be considered to have been properly notified of any proposed action of the association, by its officers, whenever such notice shall have been mailed to each member, or published in two issues of such county papers as may be designated by the officers.

CODE OF ETHICS.

Sec. 1. Members of this association are expected to cooperate with the County Live Stock Inspector, County Farm Adviser and the State Veterinarian, in efforts to control and eradicate cholera as well as other diseases among swine inCounty.

Sec. 2. Every member of this association whenever sickness occurs in his swine which appears to be infectious in nature, shall immediately notify the County Live Stock Inspector, County Farm Adviser and the State Veterinarian of the existence thereof.

Sec. 3. No member of this association shall allow a carcass of any hog which dies to remain upon the ground, but he shall immediately dispose of such carcass by cremation, if possible; otherwise, by burial in quick lime.

Sec. 4. Whenever cholera appears among hogs of a member of this association he shall have his swine treated with anti-hog-cholera serum and also thoroughly clean and disinfect all infected yards, pens, etc., with a disinfectant of recognized strength, in order to prevent the spread of the disease. He will also allow a placard to be tacked on a prominent place on the fence adjacent to the entrance of his premises; such placard shall state in plain language that cholera exists among hogs on these premises, and shall warn all people to keep away from the hog pens thereof.

Sec. 5. Every member of this association shall prohibit strangers, and especially vendors of patent hog remedies, from visiting his pens.

Sec. 6. Every member of this association, whenever cholera exists among his hogs, shall refrain from visiting the hog pens of other swine raisers in.....county, and shall also clean and disinfect his hands and change his clothing and shoes after handling his infected hogs and visiting the infected pens, before he holds any intercourse with any other swine raised in.....County

Sec. 7. Whenever it has been determined that cholera exists among the hogs of any resident of.....County, the president of this association shall urge all swine breeders who are raising hogs in the vicinity of such outbreak, to allow all such hogs to be immunized with anti-hog-cholera serum.

Sec. 8. Every member of this association shall have displayed in a prominent place on a fence near the entrance of his premises, a stenciled sign reading as follows: "Member of.....County Swine Breeders' Association—no visitors allowed in hog pens without permission."

Sec. 9. Every member of this association agrees to see that the rules of the association and its code of ethics, as well as the laws of the county of.....and State of.....concerning the eradication of hog cholera, are properly complied with by his neighbors, and each member further agrees that when violations of these rules, code of ethics and laws come under his observation, he will immediately notify the member of the executive committee who lives in his district, as well as the president of the association, and also, if necessary, the State Veterinarian.

Sec. 10. As hogs which are vaccinated by the sero-simultaneous method for producing immunity against hog cholera are, in many instances capable of transmitting cholera to non-immunized hogs, every member of this association agrees, whenever his hogs are so vaccinated, that he will permit his premises to be placarded as follows: "HOGS ON THESE PREMISES HAVE BEEN VACCINATED WITH VIRUS AND SERA: NO VISITORS ARE ALLOWED IN THESE HOG PENS."

Such a member shall also handle his hogs and prevent the extension of hog cholera infection, as provided for in Section 6 of this article.

Sec. 11. The members of this association agree, wherever possible to remove their hog pens from portions of their ranches that abut on public roads.

Sec. 12. Every member of this association agrees that whenever new hogs are purchased from outside of.....County, that they shall be placed by themselves for a period of at least thirty days before being turned in with the other hogs.

DISSEMINATION AND PREVENTION

A. T. KINSLEY, Kansas City, Mo.

DISSEMINATION. The original source of the virus of hog cholera like the origin of other viruses and pathogenic agents is unknown. The following are the principal sources of virus of hog cholera: infected swine, the discharges from infected swine, the carcasses of swine dead of cholera, virus used in simultaneous immunization of swine; food, water, vehicles of transportation, stock yards, and any other substance, object or animal contaminated with the discharges of infected swine, or the tissue juices or products of the carcasses of swine dead of cholera.

From the foregoing the ease of dissemination of infection is readily comprehended. The virus is transmitted from an infected swine on non-infected premises to other swine, soil, food, water, and bedding, thus practically insuring infection of the surroundings and of other swine on the same premises. Serious outbreaks of cholera are sometimes traceable to the introduction of a boar or other animal that is infected. If the carcasses of swine dead of cholera are permitted to remain in the hog lot other swine will become infected by eating of the infected flesh and the soil and surroundings will also become contaminated with the virus. (Some men have shown their faith in the protection of swine against cholera with serum by putting the carcasses of swine dead of cholera in their pens and thus infecting the premises).

From the lack of care in the use of virus in simultaneous immunization, there is little doubt but hundreds of farms have become infected.

Food hauled in wagons or other vehicles that have been previously used in transporting cholera infected swine may become contaminated and infect healthy, susceptible swine and thus produce hog cholera.

Water is frequently the source of infection. This is especially noticeable in the spread of hog cholera in sections of country in which there are many small streams. Such enzootics usually follow the streams. The contamination of surface water is due to the discharges and even the carcasses of cholera infected hogs being washed into small streams. Many hog raisers have fenced and made pastures of the low lands and the small streams of water, thus increasing the possibility of infection.

Most every state in the union and many foreign countries permit the shipment of cholera infected swine to market centers. By this means stock yards, stock cars, and the railroad right of way becomes contaminated with the discharges of cholera infected swine and the chances are that some of the discharges contain the virus of hog cholera in sufficiently virulent form to produce cholera in healthy, susceptible swine. By this means, cholera is, no doubt, frequently transported hundreds of miles and new centers established. As yet few if any states actually require the cleaning and disinfecting of cars that have been known to have been used to transport cholera infected hogs to the market, and therefore, the cars continue as a source of infection for some time after the cholera infected hogs have been unloaded. By the practice of shipping cholera hogs to market, practically all public stock yards become infected and are therefore a source of danger in the community. The cholera infected swine are hauled or driven from the farm to the railroad station along or over the public road which thus becomes a source of infection, the virus of which may collect upon the feet of horses, wheels of wagons or other vehicles and be transported to farms where infection had not been present.

The possibility of virus carriers of hog cholera infection must be admitted, for such carriers and distributors of infection occur in other infective diseases. It has been claimed by good authorities that swine immunized simultaneously do not eliminate the virus but this claim has not been satisfactorily proven. Because of the possibility of simultaneously immunized swine eliminating infection, they must be considered a source of infection.

Dogs, crows, buzzards and pigeons are scavengers and are an important factor in the dissemination of infection. Visiting back and forth and exchanging labor are prolific means of carrying infection from place to place. Careless veterinarians have in some instances apparently been responsible for the transmission of hog cholera from infected to non-infected premises.

Garbage containing scraps of pork has been a means of disseminating hog cholera virus.

PREVENTION. It is probable that more proprietary remedies have been devised and advertised as hog cholera cures than for any other disease of domesticated animals. The application of therapeutic agents, other than anti-hog-cholera serum, has not proven satisfactory in any proven outbreak of cholera.

With this disease as with any other, prevention is far better than treatment. This is a preventable disease but unfortunately it has been responsible for extensive losses of swine for so many years in practically every country, that the swine breeders and raisers have apparently become accustomed to the losses and accept it as a matter of fact and until recently, with little concern as to methods of prevention. The prevention of hog cholera may be accomplished by complying with the laws of hygiene, the enforcement of sanitary police regulations, and by immunization of swine by the use of anti-hog-cholera serum.

The laws of hygiene of other domesticated animals than the swine are fairly well provided for by the stock raisers. It has been the custom and it is far too common at the present writing to consider that anything is good enough for swine. Thus, many men having extensive financial interests in pork production are constantly seeking fermented grain, moldy and otherwise spoiled or damaged foods for their swine, because such food stuff can usually be purchased for less money than a clean, wholesome food. Such foods interfere with the digestion, thus weakening the animals and rendering them more susceptible to disease. Swine that are given the proper diet are not necessarily immune to cholera but they are much more resistant than swine affected with digestive derangements. Swine should also receive an abundance of clean, wholesome water and not be required to drink water from polluted streams or stagnant pools. Many cases of what would probably have been fatal cases of cholera have been nursed back to health by providing good surroundings and a liquid diet, consisting of sweet milk from a cow.

Hog pens should not be placed, as they frequently are, in locations where they cannot be properly drained. It is not necessary for swine to have mud and filth for their existence, they will thrive better when kept in sanitary quarters.

Sanitary police regulations or general sanitation in relation to control of hog cholera has certainly not received the proper consideration. If rules and regulations were instituted prohibiting the dissemination of hog cholera, the losses could be rapidly diminished. The following provision for quarantine and shipping regulations were recommended by the committee on uniform methods for the control of hog cholera at the meeting of the United States Live Stock Association in December, 1913:

1. The shipment or movement, interstate, of swine affected with hog cholera to be prohibited.

2. Exposed swine to be shipped under permit and placarded.
3. The movement of cholera infected swine over the public highways of the state to be prohibited.
4. Provision for moving exposed swine under permit in approved manner.
5. Carcasses of animals, and particularly of swine that have died of cholera, to be burned within twenty-four hours after death, or under special permit to be disposed of otherwise.
6. The shipment by rail of swine for purposes other than immediate slaughter to be permitted only through special pens and unloading chutes or through portable chutes directly into wagons. If unloaded in regular loading pens, to be moved under permit in approved manner.
7. Public stock yards to be under close supervision and cleaned and disinfected at intervals determined by the proper state authorities.
8. Railway cars for the transportation of swine other than such as are intended for immediate slaughter to be cleaned, washed and disinfected before swine are loaded.
9. All cars in which diseased swine are found, or in which exposed swine were shipped for immediate slaughter, to be cleaned, washed and disinfected within twenty-four hours after unloading, or cars to be held until the presence or absence of diseases has been determined.
10. All cars or vehicles of transportation carrying cholera exposed swine to be placarded in a conspicuous manner, "Cholera Exposed Swine for Immediate Slaughter".
11. Owners of swine and persons in charge, including attending veterinarians, to report without delay to state authorities all outbreaks of cholera among swine.
12. Live stock sanitary authorities to quarantine all infected herds and premises, but may permit shipment of exposed swine for immediate slaughter as above provided.
13. Infected premises to be quarantined not less than sixty days after last traces of disease have disappeared and premises have been cleaned and disinfected.
14. Infected premises to be cleaned and disinfected under supervision prescribed by live stock sanitary authorities.

(Continued in the next issue.)

MRS. LIAUTARD

As we are going to press, news reaches us of the death of Mrs. Liautard at the age of seventy-five years. She had been an invalid for many years and had received untiring care and devotion throughout this trying period from Dr. Liautard. It has been her illness and his unwillingness to leave her side, lest she should slip away from him during his absence, that has kept him away so long from America, where so much of his life's work has been accomplished.

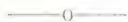
Only trouble of this character could have kept Dr. Liautard from attending the fiftieth anniversary of the A. V. M. A., which was planned in his honor and of which he would have been and was—even in his absence—the central figure.

Mrs. Liautard was a former resident of New York. Her delicate health was unequal to the vicissitudes of a sea voyage, because of the seasickness to which she was subject. Dr. Liautard did not hesitate to lay aside his own ambition and forego the honor prepared for him in order to consecrate himself to her welfare. To him it was less of a sacrifice than it would have been to many others, less noble in character, to accept the duties laid upon him and devote himself tenderly to her care. Our sympathies go out to Dr. Liautard in this period of deep affliction.

NECROLOGY

DR. JAMES S. ELLIOTT

The death of Dr. James S. Elliott of Clinton, N. Y., occurred October 12, at a Utica hospital. The cause of his death was an attack of Bright's disease from which he suffered a little over two weeks. Dr. Elliott was born in Cumberland, England in 1864. He came to America in 1884 and graduated from the Toronto Veterinary College with the class of 1892. His practice in Clinton began in 1894, where his skill and services were much esteemed, both as a veterinarian and a public-spirited citizen. For the past three years he was officially connected with the State Agricultural Department where his services were much appreciated. Dr. Elliott is survived by a wife and four children.



DONALD McINTOSH

Dr. Donald McIntosh, professor of Veterinary Science at the University of Illinois, Urbana, died on September 5, at his summer home in Portland, Me. He lacked but a few months of serving the university for thirty years continuously, and thousands of students are willing witnesses to the helpfulness and reliability of his instruction. He lived for his work and worked to the last; only five days before his death he had retired from active service on a university pension. Dr. McIntosh went to the University of Illinois as special lecturer and in June, 1886, was elected to his permanent position. He arrived at a time when the university possessed but three buildings for instructional purposes and the student attendance was but 332.—*Breeders' Gazette*.

COMMUNICATIONS

*Editor, Journal of the American Veterinary Medical Association,
Ithaca, N. Y.,*

Dear Sir:

A recent case of anthrax in man in a New York Hospital was given unusual publicity by the daily press. This was primarily due to the great respect which the patient enjoyed in his community, and also to the extraordinary courage he manifested during the course of his horrible affliction.

My stenographer happened to be in New York at the time, and reading of the case, he lost no time in communicating with the attending physicians, calling their attention to an anthrax serum which has been prepared by me and which has been extensively tested, for both its prophylactic and curative value.

The stenographer had this information from taking dictation from me while I was preparing a paper on the subject for the American Veterinary Medical Association's meeting at Oakland, and also from notes which he transcribed for me in connection with the work during the progress of the experiments.

Upon telegraphic request the serum was forwarded to New York, and was repeatedly administered to the patient with apparently good results. From the reports of the attending physicians the infection had subsided, but as a result of extreme heart weakness he succumbed quite suddenly; his recovery from anthrax being announced in the bulletins sent out by the physicians.

In the meanwhile the daily press heralded the serum as a wonderful discovery, and made many mistatements as to its preparation, application, origin, etc. It is needless for me to explain the difficulty of having scientific matters correctly quoted in the daily press. It was a useless task to have correct data published as to the serum and its preparation. I was placed as a central light in many newspaper dispatches which was rather an embarrassing position, realizing the undeserved credit given to me.

I have undertaken the experimental work in immunization against anthrax with a view of establishing a more satisfactory method of immunization than those which are now employed in this country. The simultaneous method—consisting of an injection of a potent anthrax serum and a carefully standardized spore vaccine—proved very promising and to my mind superior to the Pasteur method. The results of these experiments were embodied in my paper read before the A. V. M. A., in which have also been included the results of field experiments.

During the progress of the work we had occasion to treat a considerable number of affected animals with our serum, and obtained remarkable recoveries in a very high percentage of cases, including some of the most severe types. The stenographer, knowing

of these results, praised the curative qualities of the serum somewhat beyond its known value, which naturally was interpreted by the newspapers as something wonderful.

It is needless for me to state that anthrax serum has been prepared in Europe by many institutions, and that this phase of immunization has been practiced for several years. We have, however, succeeded in concentrating the serum by a method of precipitation and are now endeavoring to prepare the specific proteids of the immune serum in a dry form to insure its keeping qualities and to prevent contamination. Furthermore, the vaccine which is being used in connection with the serum is an accurately standardized spore vaccine, by which it is possible to establish accurately the number of spores given to an animal.

Although I am satisfied that members of the veterinary and medical professions are familiar with the work which has been carried on in the immunization against anthrax, nevertheless I deem it advisable to state my position in the case in order that I may not be misjudged as attempting to claim priority for something which should and is known by all professional men to belong to others.

It might be of interest, however, to state that in the course of the experiments it was necessary for us to obtain anthrax serum for comparative tests, and to our surprise we found that it was not obtainable in this country. We therefore imported a quantity of such serum, and to our further surprise the comparative tests revealed our serum to be at least twice as potent as the one of foreign make, and this may in part explain the splendid curative value of our anthrax serum.

Very truly yours,

A. EICHHORN,

Chief, Pathological Division.

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REVIEWS

ANIMAL CASTRATION—J. V. LACROIX

SPECIAL CATTLE THERAPY—MART R. STEFFEN

WOUND TREATMENT—MERILLAT, HOARE AND OTHERS

Published by the American Journal of Veterinary Medicine, Chicago, Ill., 1915.

These books form numbers 7, 8, and 9 in the Veterinary Medicine Series edited by Dr. D. M. Campbell.

It may be inferred from Dr. Lacroix's preface that the book on ANIMAL CASTRATION is intended largely for students. Although some of the information relative to restraint and preliminary arrangements is presumably known and used by those in practice, there is much that will appeal to the practitioner as well as to the

student. The book contains 144 pages including 23 illustrations, of which the most are reproductions from clear photographs showing methods of restraint, the operating field and different stages of operation. The typography is clear and the quality of the illustrations is enhanced by the excellence of the paper.

SPECIAL CATTLE THERAPY is a work of 157 pages and covers quite a wide variety of topics which the practitioner is likely to encounter in his routine practice. We note the absence of any discussion of contagious abortion, a topic of considerable practical importance in many localities and on which many veterinarians would doubtless be glad to get further light. The usefulness of the book might be still further increased if there were a table of contents for convenience of reference. The topics are treated concisely but clearly; the style is informal and interesting and the general effect indicates an extended personal experience by the author. A concise work of this character should appeal to the country practitioner.

WOUND TREATMENT is a book of 186 pages. Besides the well known authors, Merrillat and Hoare, whose articles on Treatment of Wounds; Antiseptics, Past and Present, in Wound Treatment; and the Suppression of Hemorrhage, form the body of the book, there are a number of other contributions, by well known veterinarians, pertinent to the subject.

The chapter by Lewis on standardizing disinfectants, while brief, is very good. It explains clearly how to test the strength of a disinfectant and reference is made to the extensive investigations made by Rideal-Walker in England and Anderson and McClintic in the United States Public Health and Marine Hospital Service. Owing to the necessary brevity of the chapter it might have added some value if the exact references were given to the reports forming the basis of the statements made regarding methods of standardizing disinfectants. The following chapter by Lothe and Beach on the bactericidal properties of the antiseptics and disinfectants contains concise and lucid directions for disinfection and the phenol coefficient of a number of common disinfectants is given together with their cost.

Although each article cannot be treated in detail, it is sufficient to say that they are timely, worthy of study, and productive of thought. A number, if not all, of the articles have appeared in Dr.

Campbell's Journal, but as arranged in this convenient form they will doubtless be welcomed by many practitioners.

As to contents and general make-up, the books may safely be said to maintain the standard of the series and be useful to many veterinarians for study and reference.

P. A. F.

MISCELLANEOUS

The annual meeting of the Hudson Valley Veterinary Medical Association is announced for November 3, at Catskill, N. Y. The subject for discussion is Parturition and its Sequels.

The next meeting of the Minnesota State Veterinary Medical Association will be held at the Merchant's Hotel, St. Paul, Minn., January 12-14, 1916.

The Iowa State Veterinary Association will hold its meeting January 17-19, 1916. The clinic will be held at Ames on the 17th. A special car will convey the members to Des Moines for the remainder of the program.

A record for weight has been established by a calf born near Alliance, Ohio. At the time of birth it balanced the scales at 159 pounds. The mother was a grade shorthorn and the sire was a Holstein bull.

The counties of LaSalle, Bureau and Putnam, Illinois, have been placed in closed quarantine against Foot-and-Mouth Disease by a federal order, effective September 25.

Dr. J. G. Rutherford of Calgary, Alberta, has been appointed on the Dominion Development Committee to inquire into agricultural production, transportation and markets.

According to the views of the State Veterinarian of Wyoming, dourine is being stamped out of that state. Out of 245 stallions tested only three were found to be affected.

Dr. Orrin E. Dyson, State Veterinarian of Illinois is reported ill with typhoid fever, supposed to have been contracted while endeavoring to eradicate Foot-and-Mouth Disease.

A federal order effective October states that the Secretary of Agriculture has revoked the quarantine placed upon the states of Indiana, Michigan and Virginia. The quarantine status of Illinois, New Jersey, New York and Pennsylvania remains unchanged.

In an attempt to prevent the spread of Foot-and-Mouth Disease in McDonough county, Ill., it is reported that all churches, Sunday Schools, picture shows and other meetings have been ordered discontinued. Public schools are excepted.

In an effort to eradicate hog cholera from Harsen's Island, Mich., it has been found desirable to place a quarantine upon dogs.

The stock yards at Rock River, Wyoming, have been placed under quarantine by the State Veterinarian, until the yards are cleaned and disinfected according to government regulations, because cattle shipped from there to South Omaha, Neb., were found to be infected with scab.

Dr. Thomas H. Edwards of the Ninth Cavalry, Douglass, Arizona, has received orders to proceed to Manila for duty in the Philippine Islands.

A horse at North Attleboro, Mass., was electrocuted by coming in contact with surface water charged with electricity, caused by a ground wire attached to an electric light pole.

Veterinary education is receiving proper recognition in Australia. The college at Melbourne University under the direction of Prof. H. A. Woodruff gives two courses of study, one of 4 and one of 4½ years. The college at the University of Sydney, under the direction of Prof. J. D. Stewart provides a thorough 4 year course.

It is reported that 335,793 American horses have been sold to Europe between August 1, 1914, and October 1, 1915, at an average value of \$220 per head. Additional costs are: transportation \$85, insurance \$10, feed \$3, and the horse has from four to ten days' service in the battle line to pay for himself.

The Allentown (Pa.) *Call* referring to the Foot-and-Mouth Disease states that the lesson has been a severe and costly one, but it has been worth every cent spent for it in that it has taught the country and the state to be careful. The value of being irreproachably free from disease is coming to be more and more of value.

The Nineteenth Annual Meeting of the U. S. Live Stock Sanitary Association is called for December 1 and 2, at the Hotel LaSalle, Chicago. This meeting will follow just after the conference called by Assistant Secretary of Agriculture Vrooman.

T. B. Harries of Calgary, Canada, Lt. A. V. C., is seeing service with the 22d Divisional Train, somewhere in France.

JOURNAL

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PIERRE A. FISH, Editor

ITHACA, N. Y.

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NO. 3.

Bois Jerome, November 1, 1915.

TO MY AMERICAN CONFERERS AND FRIENDS:

It is only in the last days of October (the 29th), that I received information of the changes made in the publication of the American Veterinary Review, and of the promises made to our friends, by my co-editor, Prof. Ellis, of an expression of farewell on my part, at an early date.

Distance and circumstances have not allowed me to acquit myself before this, and I do it to-day, in advancing the invoice of my usual, monthly communication for January, 1916.*

Since 40 years, or about that, when the American Veterinary Review was first trusted to my care by the UNITED STATES VETERINARY MEDICAL ASSOCIATION, and given to me afterward, I have endeavored to make it one of the best means to elevate our profession and to put it on the footing worthy of being its noble representative!

All my efforts and all my energy I have used with that object in view.

The last change and selection of the Committee of the National Association seems to say that I have not altogether failed.

But no matter how earnest and with personal disinterested

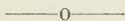
* Dr. Liautard attached this communication addressed to the American Veterinary Profession, to his chronicles for January, 1916, but having reached us in time for publication in the December issue we give them to the profession now.

motives that my endeavors may have been, they could not have succeeded or corresponded to my professional ambitious views, had it not been for the kindness, the indulgence, the support and the assistance of every nature, that all my friends in America, all our readers, collaborators and correspondents, have given me; and also the good staff I was fortunate enough to attach to the work.

It is to them ALL that I owe thanks and expressions of gratitude. It is to them that I address myself to-day; for without them, the great object of the United States Veterinary Medical Association could not have been realized.

Now, it is the JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION, which will continue the work. It has at its head, one whose efforts will never be wanting, and who will keep well in view the main original object of the creation of the journal, viz: the elevation of the AMERICAN VETERINARY PROFESSION! A bright future stands for it under his guidance.

A. LIAUTARD.



STOCKMEN AND LIVE STOCK SANITARY CONTROL

Our country has passed through an epizootic of foot-and-mouth disease that has caused heavy losses and has tested somewhat severely our system for the control of such diseases. The outcome has been gratifying in that the disease has been practically eradicated. Notwithstanding this noteworthy victory for the country, there are those who feel that the veterinarians who directed the control work should be replaced by stockmen. The advocates of this change wish to retain veterinarians in an advisory capacity but they desire to place all administrative duties in the hands of so-called practical men. This means that quarantines shall be raised, cattle released and traffic resumed whenever laymen think it wise or expedient. They seem to feel that "practical" men would be able to control the infectious diseases better than the veterinarians who have been trained in the nature of the maladies. The inference is drawn that if stockmen had directed this work when foot-and-mouth disease broke out, its spread would have been checked and the losses sustained from it would have been much smaller.

It would seem that those who wish to subordinate the veterinarians in sanitary work do not recognize the fact that under the present regime veterinarians are officially under laymen in prac-

tically every position they hold. The Chief of the Bureau of Animal Industry is under the Secretary of Agriculture. Official veterinarians in the states are, in nearly all if not in every instance, under the Commissioner or the Board of Agriculture or a live stock sanitary board composed of laymen. In this epizootic of foot-and-mouth disease, as in times of other epizootics, the lay officials responsible to the people for their control necessarily depend upon the recommendations of their veterinarians. It is interesting to note, that few if any of these officials have criticised the action of the veterinarians in their employ relative to their recommendations or acts in connection with the recent outbreak of foot-and-mouth disease. These men understand that they must have technical advice and further they know how difficult the work has been and how easy it is to make mistakes. The loyal support of the veterinarians by the lay officials immediately over them is most gratifying. It speaks well for the efficiency of the system of organized veterinary service in this country.

The proposition to replace official veterinarians by stockmen, thus placing the technical work one step farther removed from the power to act, should be carefully considered. Fortunately we have examples of the action of laymen in regard to infectious diseases which should be reviewed by those who feel that men untrained in sanitary science should be given still greater authority in the handling of animal plagues. If recorded statements are correct, the dissemination of infectious maladies, not only in this but in other countries, can be traced largely to the action of stockmen who, in their transactions, have not taken into full consideration the restrictions or the requirements necessary for the prevention of the spread of the disease. By their methods, such plagues as tuberculosis, glanders, infectious abortion and hog cholera have become widespread, causing annually losses amounting to tens of millions of dollars more than the past outbreak of foot-and-mouth disease, serious as it was. It has been the stockmen themselves who, in their dealings, have defied the knowledge of the laws of infectious diseases and by their unguarded, though well meaning actions, have permitted these maladies to be scattered broadcast in our land. It has been largely the animal owners or those dealing in live stock who have opposed most strongly legislation recommended for the better control of these diseases.

It is not necessary to restrict the analysis to violation of know-

ledge concerning the spread of the more common infectious maladies. History shows that laymen have been responsible for the spread of the most serious plagues of animals from one country to another. We are told in the records that it was the importation of cattle which had had contagious pleuro-pneumonia from Europe to Africa and Australia that introduced this terrible disease of cattle in those countries. It was cattlemen who took this same disease from Australia to the Philippine Islands. It was a cattleman who but a few years since would have unintentionally introduced surra into this country had it not been for the wisdom of the Bureau of Animal Industry in securing, some years since, a national quarantine against the importation of cattle and the vigilance of the veterinarians in that Bureau in detecting this infection in the imported animals while they were still in quarantine. Again, the introduction of dourine into this country by importing an infected stallion can be traced to laymen. If we go still further back in the history of these and other animal plagues we find that a century and a half ago they became a serious menace to the live stock industry of Europe. Because animal owners and those engaged in live stock dealings were unable to check their spread, European governments established veterinary colleges for the immediate purpose of training veterinarians to take charge of and direct the control work. It is significant that in those countries where veterinarians are given the greatest amount of authority and support there is the least amount of trouble with animal diseases.

Is it reasonable to expect that laymen who are not trained in the parasitism of infectious diseases; who do not grasp the danger of the infected but apparently well animal; who do not appreciate the subtle power of "bacilli carriers" or occult cases; who do not know the intricate questions involved in a quarantine; and who do not understand the variety of manifestations of infectious diseases, would be able to initiate precautionary measures of sufficient breadth and rigidity to prevent the spread of the viruses of these affections?

The work of veterinarians in this country, acting under the authority and with the consent of their superior officials, is also a matter of record. It was the knowledge of the diseases of animals that enabled, in the early eighties, the late Dr. Salmon to persuade Congress that a Bureau of Animal Industry should be established in the United States Department of Agriculture to guide efforts in combating infectious animal diseases. At that time this country

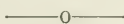
was invaded by contagious pleuro-pneumonia of cattle, a disease that had cost Great Britain and continental Europe untold millions and which was threatening the cattle industry of America. Having obtained authority, a scientific campaign of eradication was waged, often in the face of bitter opposition, with the result that the disease was eliminated in 1892. Until veterinary advice, based on special research, was heeded, the northern states were visited almost annually by Texas fever, which resulted in a heavy loss of cattle. It was the veterinary service, centered in the Bureau of Animal Industry, state departments and live stock sanitary boards, that has cleared this country of foot-and-mouth disease on previous occasions. It was heeding the advice of veterinarians that enabled Great Britain to eradicate contagious pleuro-pneumonia and rabies from the British Isles and to keep the latter out of Australia altogether.

So far as can be ascertained from the discussions on this subject, the bases for the proposed change are largely misunderstandings. The veterinarians were in no way responsible for limits of value to be paid for condemned animals, especially the pure bred stock. The methods of eradication that required the slaughter of exposed as well as diseased animals were not of their motion but the results of scientific investigations and experience with the disease in other countries. Because all stock owners were not ready and willing to co-operate in the enforcement of these methods there is no reason for changing the source of authority, for the *procedure must be the same* if the disease is to be eradicated. A very casual inquiry will show that live stock sanitary regulations must be directed by men trained in the basic sciences which, brought together, compose the veterinary curriculum. The only place where these subjects are correlated and taught is in a veterinary college. It is not unlikely that in the near future certain veterinary colleges may give additional work in sanitary science for the specific purpose of training more carefully a certain number of veterinarians for this special service. It is hoped that such a course may soon materialize. Live stock owners, however, should consider in this connection that such special preparation is expensive in both time and money and that individuals cannot afford to qualify unless they are assured of the support of the state and stockmen after they have thus prepared themselves.

When the interests of the live stock industry are fully considered, there seems to be no rational basis for the proposed replac-

ing of official veterinarians by "practical" laymen. The only men to deal with these important subjects are those who have an intimate knowledge of them. If the veterinary service is not satisfactory or as efficient as it should be, it would seem more reasonable for those who are dissatisfied to give the veterinary profession their moral, financial and educational support in order that it may attain to a degree of efficiency necessary to accomplish *all* that can rightfully be expected of it rather than to replace the veterinarian with men technically unqualified. When the disharmonies are corrected, the personal equations eliminated and all the facts brought to light, it is confidently believed that the only changes that will be necessary for satisfactory live stock sanitation and control of epizootics will be a more loyal support to the veterinarians charged with this work. In this country, the veterinary profession is still young, and both national and state governments have much yet to do by way of perfecting their organizations. Contagious pleuro-pneumonia resulted in giving us the Bureau of Animal Industry and this outbreak of foot-and-mouth disease should give to each and every state a better organization of veterinarians for public service. A system of district veterinarians armed with authority to act promptly on all matters pertaining to the introduction, spread or control of infectious and epizootic diseases should be as effective in this country as it has been in Germany. The lesson taught by all epidemics and epizootics as well as by the more common experiences of life is, that for success in technical work technically trained men are necessary.

V. A. M.



EUROPEAN CHRONICLES

NEMATODES AND THEIR TREATMENT

The *Recueil de Medecine Veterinaire*, which, on the declaration of war in August, 1914, had been forced to arrest its publication has made its reappearance, and the XCI volume will be completed by the numbers which will now successively appear up to the end of 1915. A whole year 1914-1915 will thus be formed. All readers of the *Recueil* the oldest means of propaganda of French Veterinary Science, will no doubt welcome back their old friend.

The present number contains from Prof. A. Railliet of Alfort a long article on the use of *drugs* in the *treatment of the diseases caused by nematodes*, which was a report that the learned Professor

presented to the International Congress of London. The subject is immense and can not be treated in all its details and only the principal parts relating to it can be considered.

First of all, Prof. Railliet gives full consideration to the enumeration of the most important forms of nematodes that are found in the digestive apparatus, as they occupy this or that part of the digestive canal, stomach and various portions of the intestines in the domestic animals, the ascaridæ, heterakidæ, oxyuridæ, strongylidæ, trichostrongylidæ, dioctophymidæ, spiruridæ, trichuridæ, gnathosomidæ, anguillulidæ, rhabdiasidæ, and the sub-families of some of these are presented with reference to the species of domestic animals in which they are found and the portion of the digestive canal where they are met.

First come a few considerations of the precautions, which must be taken, such as the necessity to have the treatment preceded by a kind of preparatory cure to render the parasites more accessible to the action of the anthelmintic drugs, when complete or milk diet is then indicated. It is also important to bear in mind the seat occupied by the parasites. If the expulsion will generally be easy to obtain when the *stomach* or *small intestine* is the place of habitation, there may be some difficulty when in the presence of some anatomical condition, as is the case in bovines. Again when the parasites are in the *large intestine* the administration *per orem* often remains inefficacious, and one must have resort then to interference *per anum*.

Then the examination of the treatment begins.

First come the *nematodes of the small intestine*. Against the ascarids of monogastric mammalia, two drugs seem to be advocated by practitioners, tartar emetic and arsenious acid. Although sulfide of carbon, spirits of turpentine, thymol, etc. are also recommended by many.

Against ankilostomiasis of dogs, thymol or the treatment used in the human form of the disease is recommended.

For the heterakidæ of fowls, there are many drugs which have been recommended, but the efficacious remedy is yet to be found.

The nematodes of the abomasum and small intestine of cattle require peculiar care. Creosote, in preference to that of coaltar, alone or with thymol, is very useful. Sulfate of copper, phenicated water, spirits of turpentine, etc., etc., have also been used.

The nematodes of the large intestines are hard to dislodge, when

drugs are given by mouth, and evidently the chances for success are greater if they are administered per rectum—thymol, injections of atoxyl.

* * * * *

The principal nematodes of the respiratory apparatus are the syngamidae, the metastrongylidae, and the trichuridae. The second of these are the most important from the economical point of view, giving rise by their presence to verminous bronchitis or to verminous pneumonia.

Among the many old modes of treatment which, unfortunately, have not always constant efficiency, may be mentioned the fumigations of tar, aromatic substances, phenic acid or creosote. The intratracheal injections recommended by Levi are of little practical application. Spirit of turpentine, chloroform, benzine, creosote, formol, etc., have been tried with almost negative results.

If injections have been finally put aside, creosote sprays seemed to give better results. It is probably the best method, providing the pulverizator is a good instrument and works well.

In the same category of nematodes of the respiratory apparatus, there comes the syngamosis which causes such severe losses among fowls.

Fumigations and intratracheal injections are the only methods that can be recommended. Carbolic acid and tobacco smoke inhalations have done good. Salicylate of soda in intratracheal injections seems to give the best results of all. Eucalyptus has also its advocates.

* * * * *

In a third chapter, the *nematodes of the circulatory apparatus* are considered. These worms are found in the blood and lymphatic vessels in various stages of their evolution. But few are the attempts that have been made to reach and destroy them. Intravenous injections of atoxyl, tartar emetic, aniline, etc., have been tried in human medicine, but none with positive marked results.

The *nematodes of the closed cavities and tissues* occupy a fourth chapter. Quite a number of these parasites, inhabit serous cavities, which belong to the filaridae. Others live in the viscera or in deep tissues, again others in tendons, coats of blood vessels, and subcutaneous connective tissue. But against all these parasites we are almost disarmed. The attempts at treatment which have been made have given almost insignificant results, and yet they must not be abandoned.

Some nematodes are also found in the thickness of the skin, the cause of the granular dermatitis of horses and cattle. Against this, the permanganate of potash in solution has been lately highly recommended, in injections round the seat of diseased parts.

For the *nematodes of the urinary apparatus*, Railliet in the following chapter, says that up to this day no therapeutic treatment has been tried against the strongylidæ, the dioctophymidæ or the trichuridæ that may exist in the urinary organs. Agents possessing diuretic and anthelminthic properties might be recommended.

The *nematodes of the apparatus of vision* belong to two distinct families, the filaridæ and the spiruridæ. The former are intra-ocular and are treated by extraction with puncture of the cornea. Yet the use of ointment, under the eyelid, of red oxide of mercury, or of weak tincture of aloes has been used successfully. Also the internal administration of sulfuret of mercury.

The spiruridæ or extra-ocular nematodes are successfully treated by washing the eyes with a solution of bicarbonate of soda or cerolin, 1 or 2%.

ANTITETANIC SERUM AND ACCIDENTS,

I do not know to what extent our friends of the *Review* have recourse on themselves to the protective use of the serum when by some way or another they may, in the performance of their various professional duties, be exposed to tetanic infection.

However, the statement made by a veterinarian Mr. R. Parent before the *Société de Pathologie Comparée* and reported in the *Revue* of this organization, will prove very interesting and instructive. The case gets a greater value from the fact that it is a direct observation, noted on himself where all the manifestations he personally felt are usefully described as follows:

“Having on the hands, sores which had been soiled by pus from a horse suffering with very acute tetanus, I received (says Mr. Parent) an injection of antitetanic serum, with all the aseptic attention possible. It was followed by slight soreness at the point of injection and disappeared after two days. That was on Sunday; on the following Tuesday and Wednesday, there was slight itching at the point of injection. On Thursday, the left upper eyelid itched, the conjunctiva was affected and a marked flow of tears took place. This lasted some three hours, when with a violent feeling of soreness,

the lips began to swell, lost their natural shape, and gave the impression of having been severely bruised. Then there appeared on the hands and feet a severe itching sensation, which rapidly extended to the arms, thighs and lower part of the abdomen. The itching was followed by the appearance of numerous little elevations, analagous to pricks of needles, which soon gathered and formed a wide red patch with an edematous swelling round it. This subsided gradually but the itching returned more severely, then subsided, to reappear from one place to another. A small quantity of urine was passed. It was yellow and contained some albumin."

While making the examination of the urine, Parent was seized with general weakness, his limbs seemed to refuse to support him. He reached a chair, could hear all that was said to him but was unable to answer a word. He was put to bed, the itching returned again and finally subsided with all the other manifestations during the night and the following morning.

* * * * *

After this description of the series of accidents to which he had been submitted and which lasted several days, Parent continues in his report, "These few detailed facts show that I have had a series of accidents following the injections of antitetanic serum and I remembered that in 1906 I had had one injection for a wound made with the calk of a shoe that I was taking off from a diseased foot, and I remembered also that I had another in 1910 for a bite on a finger. For four years then, I had kept in my organism sensibilities and the question may present itself if repeated injections are not useless or dangerous when made for wounds of long duration."

A similar observation was also recorded as having been observed on the partner of Mr. Parent. He had pricked himself with the needle of the syringe which had served to make an intravenous injection of serum in the same horse which had soiled Mr. P.'s hands. For 24 hours the partner had similar manifestations of itching, eruptions, etc. The partner had also received injections of antitetanic serum four years before.

A horse suffering from anasarea was treated with polyvalent streptococcic serum, and had also an injection of antitetanic serum, but presented no peculiar symptoms from it.

From the consideration of these cases the following conclusions are justified:

"1. In a man who has received 2-3 injections of antitetanic

serum there remains in him, even after four years, sufficient sensibility for serial manifestations to take place after a new injection of said serum.

"2. The manifestations have occurred in the two cases recorded between five and six days after the injection of the serum, which is a time rather longer than in the production of the ordinary anaphylactic phenomena.

"3. Horses that have received very large doses of polyvalent antistreptococcic serum can, without inconvenience, receive antitetanic serum injections."

PYOCULTURE AND OPSONIC INDEX

In a comparatively recent chronicle, I called the attention of our readers to the method described before the *Academie des Sciences* here, on the value of the pyoculture in the prognosis of wounds.

The author, Prof. Delbet, on the same subject and in comparing it with the opsonic index recalls the question in a few words, presenting the principle and the technic of his method, that of pyoculture.

The method consists in cultivating the microbes, in the very secretions of the wounds and to draw from the examination of the cultures our appreciation on their prognosis.

The technic is very simple. It consists essentially in taking the pus with an ordinary pipette; and, placing one drop of that pus on a slide to make immediately a preparation. Another drop is dropped in a tube of peptonized bouillon, and then the pipette is closed in the alcohol lamp and placed in the hot air chamber, but kept in a damp room to prevent its dessication. After 24 hours a preparation is made with the pus of the pipette and one with the bouillon. From the comparison of the three preparations, indications on the prognosis are drawn.

The idea of Mr. Delbet was that by placing the pus itself in the conditions of temperature favorable to the development of microbes, it would, so to speak, be possible to measure the struggle which takes place between the pathogenic agent and the resistance of the organism.

Experiments have shown that it is such and it is sufficient to compare the results of the cultures of pus with those of the pyo-

culture. In some cases, the microbes develop in much greater abundance in the pus than in the bouillon; it is proof that the secretions from the wound are peculiarly favorable to the microbes or that they have adapted themselves to them; the organic defenses are insufficient or without effect; the pyoculture is called *positive* and the prognosis serious. In others, on the contrary, the microbes develop in the bouillon and not in the pus, pyoculture does not take place; the organism is struggling. There are even cases, where the microbes diminish in the pus; they are bacteriolized, while they multiply in the bouillon; the pyoculture is *negative*, the prognosis favorable, the organism will succeed. Finally in some cases, it is not the same microbes that develop in a marked manner in the pus and in the bouillon; the pyoculture is *elective* and the results must be analyzed.

* * * * *

Other investigators have verified in an affirmative manner all the facts of pyoculture, but they have observed others which made them establish a comparison between the results of pyoculture and those of the opsonic index.

Mr. Delbet had also taken this comparison into consideration and it had seemed to him that the opsonic index could not give information in some local phenomena. When a patient has two wounds, one may be doing well, the other not. If both are injected with the same microbe, the opsonic index must be at least in favor of one of the two.

And again, to measure the opsonic index, cultures must be used; and it frequently happens that the microbes, which predominate in the bouillon are not those which are in the pyoculture. In these conditions, the results of the opsonic index are unavoidably vitiated, as long as the greatest number of microbes presented to phagocytosis are not of the species which causes the principal infection. The demonstration is evident.

While these investigators were making pyocultures, another was establishing the opsonic index of the same patients. The comparison of the results obtained by these workers were that the opsonic index most often corresponds to the pyoculture. In the cases where the results differ, it is the pyoculture which agrees with the clinical evolution, and the opsonic index which is at fault.

In conclusion, without desiring to criticize the theory of the opsonins, the writer says that:—"In all cases, it is to pyoculture

that most faith must be placed in the cases where the results differ from those given by the opsonic index." Pyoculture is much simpler and much easier; a simple morphological and quantitative examination is sufficient, and to practice it one need not be an experienced bacteriologist. Its practical value has been demonstrated.

BLOOD SERA AND HEMORRHAGES

Dr. P. E. Weil has written recently for the *Presse Medicale* an article on the subject with their applications and their indications, which offer to the reader a general interest. Indeed in the last twenty years, the therapeutic arsenal has added to her provisions a series of new agents which seem to possess a real efficiency against hemorrhages, such as gelatin, chloride of calcium, adrenalin, sera from the blood, pituitrine, emetine, etc., substances which have given important results and deserve not to be ignored.

At the same time, sera from the blood are those which the author desires to consider, principally in cases where hemophilia is present. He has recommended them since 1905, has made numerous experiments with them and has finally come to the following conclusions:—1. The serum that modifies the blood of such individuals, the hemophilous, possesses a preventive property against their hemorrhages and its administration presents a great surgical interest. 2. The injection of serum is able to arrest an hemophilic hemorrhage in quite a short lapse of time.

Both of these conclusions have been confirmed by many authors in France and foreign lands, and the records that have been made, have permitted Dr. Weil to confirm the curative value of the sera and to extend their use not only to the cases of dyscrassie hemorrhages, but also to all serious hemorrhages in general.

At first it was the fresh human serum that was resorted to, that is a serum obtained by an aseptic vivisection on a healthy man twenty-four hours before it was used. From specific causes the use of this serum was not practical and others were looked for.

Animal sera, though having a less active curative action, gave good clinical results and then the serum of the rabbit, bovine and horse was tried.

The first was given up, because of the small quantity of serum that only one animal could give.

That of bovines was also laid aside, although it proved itself

very active, because it frequently gave rise, even with the first injection to toxic accidents quite serious.

The serum of the horse does not offer any of these objections, and it is the one that must be used.

The article of Dr. Weil is then continued by the consideration of the physiological and the therapeutic action. With the mode of administration, the injections are given sub-cutaneously intramuscularly or intravenously. The former are the best and the simplest. There are even indications to resort to the direct application upon a bleeding surface. But it must be remembered that in such cases to obtain a hemostatic action, it is essential that the serum and the wound should be in perfect contact—therefore, before applying it, the surface of the wound must be minutely cleared of all clots.

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A. L.

FOOT-AND-MOUTH DISEASE WITH SPECIAL REFERENCE TO THE OUTBREAK OF 1914-1915*

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INTRODUCTION. During the past year a widespread outbreak of foot-and-mouth disease has passed over the United States, the most serious and extensive that has ever occurred in this country. The disease has been found in 22 States and the District of Columbia, at places ranging from the Atlantic to the Pacific coast. Previous outbreaks in this country have been limited to comparatively small areas. The latest invasion was discovered in the vicinity of Niles, Michigan, in October, 1914 after it had evidently been under way since August of the same year. Unfortunately the mild form and atypical appearance of the first cases permitted the disease to spread without recognition to a considerable number of herds of cattle and hogs. Some of the latter reached and presumably infected the stock yards at Chicago, from which it was disseminated to other stock yards and to points north, east, south and west, by shipments of live stock, especially stockers and feeders.

SOURCE OF INFECTION. Many theories of the manner in which the infection was introduced into the United States have been advanced and all those which permit of investigation have been diligently studied and disproved. Among those theories which have been thoroughly investigated with negative results are the introduction of the virus with small pox vaccine from vaccine establishments in Michigan and Massachusetts, with calf dysentery serum imported from Europe, by intentional dissemination of the disease by men equipped with hypodermic syringes, by imported hides, Belgian refugees, Russian immigrants, etc. There still remain two plausible theories which can neither be proved nor disproved. First, the farmer Mr. X, on whose premises foot-and-mouth disease first made its appearance, purchased from a Chicago firm certain merchandise including two pairs of lisle gloves imported from Germany. The paper used in packing and wrapping these gloves was thrown into a hog lot about ten days before the hogs began to show a disease which subsequently proved to be foot-and-mouth disease. These hogs were the first animals to develop the disease in the 1914 out-

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break. Second, the infection may have been brought to Niles, Michigan, by burlap or matting from tannery materials imported from Argentina and Japan. These wrappings are frequently taken by tannery employees for household and farm use and their homes are located in the vicinity of the farm of Mr. X.

HISTORY OF THE INFECTION. When two weeks after the first hogs became sick the disease spread to the cattle on the same premises and simultaneously the cattle belonging to a neighbor developed peculiar symptoms. Each of the farmers called in a different local practitioner, one of whom several days later notified the State authorities of the conditions present and requested assistance. The first information that reached Washington was a telegram from an assistant inspector at Detroit on September 3 stating that he intended to visit Niles, Michigan, with the State Veterinarian to investigate a possible outbreak of Aphthous Fever at the latter's request. Reports sent at this time to Washington stated there were no indications of foot-and-mouth disease but that the lesions were characteristic of necrotic stomatitis. Nothing further was heard from the disease by the Washington office from this date until October 10 when a letter arrived from the inspector in charge of the Detroit force stating that the disease had spread during the interval from the original two herds to six additional herds in the neighborhood. In this letter no diagnosis was made of the disease but the history of the various herds was so completely described that no affection other than foot-and-mouth disease could suggest itself. Therefore, Dr. Eichhorn was sent on the next train to investigate and report. Three specimens from the lesions of the affected animals were turned over to Dr. Mohler, who immediately proceeded to the Experiment Station at Bethesda, Maryland, and that evening inoculated three calves, each receiving an intravenous injection as well as an inoculation on the dental pad. On October 12 Dr. Eichhorn wired a report stating that the clinical appearance was positive and requesting that Mohler be sent to Michigan to confirm the diagnosis. Dr. Melvin wired in return to Dr. Eichhorn instructing him to inoculate a calf and stating that Dr. Mohler was keeping the three calves, inoculated at the Experiment Station, under close observation, but would be sent to Michigan within 48 hours if no developments appeared. No symptoms of the disease developed by this time in the calves at the Experiment Station and Dr. Mohler proceeded to Niles, Michigan, arriving there at 6:30 o'clock

on the evening of October 15. He was met by Dr. Eichhorn and taken by automobile to an infected farm where an examination was made by the aid of an electric flashlight. After an examination of a number of the animals Dr. Mohler agreed that it was indisputably the European disease and a wired report was sent to Washington that night to this effect and requesting additional men to assist in the work of eradication. Active scouting by all available veterinarians starting on the morning of October 16 uncovered 39 infected herds in Michigan. On the following day, October 17, a number of additional infected herds were located in northern Indiana. A recommendation was made on that date that four counties, Berrien and Cass in Michigan, and St. Joseph and Laporte in Indiana, be placed under quarantine, which became effective on October 19.

In this connection it is interesting to note that notwithstanding Berrien County all told had 191 infected herds, which is more than any other county in the country, the adjacent county of Cass never developed a single case of the disease. After the quarantine went into effect on these four counties everything was going along smoothly and rapid progress was being made in eliminating these centers of infection. When I reached Niles on my second visit of October 27 a report had just been received from Blissfield, Michigan, that some steers from Chicago were sick. In company with Michigan officials I left for Blissfield at once arriving early the next morning, October 28. Three of the steers were found to be infected with very acute lesions of foot-and-mouth disease, while the others in the carload lot had not, as yet, developed any symptoms. As a result Lenawee and Monroe Counties, Michigan, were quarantined effective October 29. The three infected steers referred to were in a carload lot that left Chicago nine days before, and it then became a question whether the Chicago stock yards were infected or whether the steers had been shipped in an infected car. Furthermore, this was the first information anyone had that the Chicago yards might be infected, although certain individuals have evidently tried to give the impression that the Bureau had knowledge of this shipment to Michigan prior to the opening of the Dairy Show on October 22. Subsequently it was found that the three steers above mentioned reached Chicago in a lot of 49, the other 46 animals going to Chenoa, Illinois as one shipment, but they never developed any indications of foot-and-mouth disease, al-

though examined frequently. This, at least, suggested that the three Blissfield steers picked up the infection outside of the Chicago stock yards and after they had been taken from the original shipment of 49 to complete the carload lot destined for Blissfield. While a thorough investigation failed to locate infection more definitely in the Chicago stock yards it was decided to take all precautionary measures and as a result an order was issued effective October 31 quarantining the Union Stock Yards at Chicago. At the time this order went into effect the National Dairy Show cattle were in the barns of the Union Stock Yards Company, having been held for observation by the State Veterinarian of Illinois on October 29 at the request of the Bureau, and in addition a large number of stockers and feeders, as well as fat stock, were in the pens of the Union Stock Yards Company. The day following the quarantine of the Chicago yards (November 1) a Holstein cow in the Dairy Show belonging to an exhibitor from Minnesota developed unmistakable lesions of foot-and-mouth disease and two days later (November 3) several of the feeders which had been caught by the quarantine order and which were not purchased by the local packers for slaughter because of their slight value from a butcher's standpoint, likewise developed the disease. And the discovery of these cases in the Dairy Show barn and feeder section of the Chicago stock yards was the first knowledge anyone had that foot-and-mouth disease existed in Chicago.

About this time the products of a certain hog cholera serum company in Chicago became infected with the virus of foot-and-mouth disease. A careful investigation developed the fact that no serum shipped out from the plant of this company was contaminated with foot-and-mouth disease. One lot of virus, however, was so contaminated. This lot of virus was comparatively small, it being composed of 3400 c. c. of blood obtained from four pigs. These pigs were not purchased sick in the stock yards, but were well at the time they entered the establishment on October 16. They were then inoculated with hog cholera virus with the intention of using their blood in connection with administering the serum-simultaneous treatment. On October 26 these hogs were killed to furnish hog cholera virus.

The lesions found in these four pigs were only those of acute hog cholera, but evidently they were also in the incubative stage of foot-and-mouth disease. It is a well-known fact that the virus of

foot-and-mouth disease is present in the blood only in diluted quantities and then only at the beginning of the fever, before the vesicular eruptions appear. The blood will carry the virus of foot-and-mouth disease without possibility of detection except by animal inoculations, when the hogs are killed at this stage. The blood from these pigs was mixed and most of it shipped out to customers of the concern in Ohio, Indiana, Illinois and Iowa. On November 3, the inspector in charge of the plant had his suspicions aroused by sickness appearing in certain hyperimmunized hogs. This was late in the day and he visited the plant at daylight on November 4. He immediately quarantined the plant for foot-and-mouth disease, because the hogs noticed sick the evening before were worse and showed lesions of foot-and-mouth disease. All of the employees and the entire establishment were disinfected. The infection of the plant was due either to the promiscuous passing of the owners and employees of the company to and from the infected Chicago stock yards, or to the purchase of hogs exposed in those yards.

At this point the question naturally arises how and when did the Chicago yards become infected. It is impossible to make an accurate answer to either of these queries but it is logical to assume that a shipments from the original infected area of certain live stock in the incubative stage of the disease was the responsible factor. Thus when the tracing of cars began the disquieting information was disclosed that a mixed shipment containing 28 hogs, 3 cows and 54 sheep had been sent on October 8 from the vicinity of Niles to Chicago. Almost simultaneously it was discovered that the milk from an infected herd had been taken to a creamery daily for the previous two weeks and the return of the infected skimmed milk to the patrons of this creamery resulted in the rapid spread and almost spontaneous appearance of the disease on 36 farms, which number increased to over 100 before the creamery could be closed. The hogs in the Chicago shipment were among the first to receive this contaminated skimmed milk and their shipment to Chicago before the the development of the disease probably infected the Union Stock Yards.

Furthermore, the Department has learned of a number of instances where farmers and attendants from infected premises had visited the Chicago yards and infection could easily be carried by them from these infected farms to the Union Stock Yards since the reverse (farmers carrying the disease to their cattle after visiting

these yards) has been definitely proved in a number of cases. As soon as the infected steers were found at Blissfield instructions were given to trace all shipments out of Chicago since October 1, but no disease was found until November 1 in Kane and Kendall counties, Illinois, in cattle which had left Chicago October 20 and 21, respectively. In fact the evidence obtained as a result of tracing all shipments out of Chicago after October 1 clearly shows that no infection was carried with those shipments prior to the time the Blissfield steers were shipped on October 19 which, as before mentioned, do not incriminate those yards, and that the greatest number of shipments which carried infection into Illinois, Iowa, Michigan, Wisconsin, Ohio, Kentucky, and Pennsylvania left Chicago on October 21, 22, 26, 27, 28 and 30. As a direct result of the thorough work in following up all such shipments Illinois, Michigan, Indiana and Pennsylvania were quarantined November 2; Maryland and New York November 4; Ohio and Wisconsin on November 5; Iowa on November 6; and Montana on November 16. Massachusetts was also quarantined on November 6; Delaware, New Jersey and Rhode Island on November 9; Connecticut on November 16; Loudon County, Virginia, November 27; two counties in New Hampshire on December 1; four counties in Kansas on February 1; one county in West Virginia on March 1; two additional counties in Virginia on March 8; and one county in Minnesota on August 12.

As the eradication work advanced it was found advisable to maintain several different quarantine measures in the infected States and for the purpose of aiding in the recognition of these restrictions the following definitions were enacted:

(a) Quarantine Area: Any State or any portion thereof quarantined for foot-and-mouth disease in live stock.

(b) Closed Area: Those portions of the quarantined area into which the interstate movement of cattle, sheep, other ruminants, and swine is permitted, for immediate slaughter only, and from which the interstate and foreign movement of such animals is absolutely prohibited, and the movement of the dressed carcasses of such animals, the hides, skin, wool, hair, horns, or hoofs of such animals, and of hay, straw, similar fodder, manure, litter, or bags or similar containers which have been used for stock feed is restricted.

(c) Exposed Area: Those portions of the quarantined area from which the interstate movement of cattle, sheep, other rumi-

nants, and swine is permitted for immediate slaughter after inspection and certification, and into which such animals may be moved for any purpose, also from which the interstate and foreign movement of the dressed carcasses of such animals, the hides, skins, wool, hair, horns, or hoofs of such animals, and of hay, straw, or similar fodder, manure, litter, or bags or similar containers which have been used for stock feed, is restricted.

(d) Modified Area: Those portions of the quarantined area from which the interstate movement of cattle, sheep, other ruminants, and swine is permitted for immediate slaughter without inspection, to points in the quarantined area, and into which such animals may be moved for any purpose, also from which interstate and foreign movement of the dressed carcasses of such animals, the hides, skins, wool, hair, horns, and hoofs of such animals, and of hay, straw, or similar fodder, manure, litter, or bags or similar containers which have been used for stock feed is permitted without any restrictions whatever.

(e) Free Area: Those States or portions thereof which are not quarantined for foot-and-mouth disease.

On February 17 after the Chicago yards were found to have been reinfected and the disease appeared to have gained another foothold, a new feature in the quarantine orders was inaugurated termed a "restricted" area, which had for its purpose the restriction of the infection to the already infected states with a view of keeping the great western country and the Southern states free from the disease.

(f) Restricted Area: Those portions of the quarantined area from which the interstate and foreign movement of cattle, sheep, other ruminants, and swine is permitted for immediated slaughter to points in the free and closed areas, or for any purpose to any point which is or has been in the quarantined area since October 1, 1914, other than in the present closed area, and into which the animals may be moved for any purpose; also from which the interstate and foreign movement of the dressed carcasses of such animals, the hides, skins, wool, hair, horns, and hoofs of such animals, and of hay, straw, or similar fodder, manure, litter, or bags or similar containers which have been used for stock feed, is permitted without any restrictions whatever.

Prior to the adoption of the restricted area the states of Washington, Kansas and Montana had received infected cattle from what

Methods of Infection

The following table shows the number of herds slaughtered in each state, together with the methods by which infection was transmitted.

SOURCE OF INFECTION																							
Connecticut	Delaware	Dist. of Col.	Illinois	Indiana	Iowa	Kansas	Kentucky	Maryland	Massachusetts	Michigan	Montana	New Hampshire	New Jersey	New York	Ohio	Pennsylvania	Rhode Island	Virginia	Washington	West Virginia	Wisconsin	TOTAL	
1. Through animals brought direct from infected public stock yards for slaughter, feeding, breeding or dairy purposes...	2	2	0	89	19	9	0	26	19	25	29	4	0	21	45	94	289	19	4	1	0	10	707
2. Through animals brought from infected stables or lots of local dealers.....	21	0	0	20	4	0	0	12	14	17	2	0	1	0	15	25	121	9	3	0	18	3	285
3. Through direct contact with neighboring infected herds, by pasture, mating, breeding animals, or animals not confined	4	6	1	115	8	13	0	31	8	6	9	25	0	2	9	29	65	13	0	0	0	2	346
4. Through infected railway cars.....	0	0	0	9	0	0	0	0	0	1	0	0	0	4	0	1	0	0	0	0	0	0	15
5. From creameries.....	0	0	0	25	0	0	0	0	0	21	0	0	0	33	2	86	0	0	0	0	2	169	
6. From vaccination with infected hog cholera virus.....	0	0	0	94	5	2	0	0	0	0	0	0	0	0	20	0	0	0	0	0	0	121	
7. Through persons—																							
(a) Neighborhood visiting, exchanging work, etc.....	3	0	1	147	14	9	3	8	5	18	2	0	1	15	21	25	119	4	0	0	2	5	402
(b) Through local practitioners or dairy inspectors.....	0	0	0	10	1	0	0	1	2	3	0	0	0	0	0	0	24	0	0	0	0	41	
(c) By stock buyers, peddlers, etc.....	0	0	1	9	0	3	0	0	5	8	0	0	0	0	12	4	18	5	0	0	0	1	66
8. Through dogs, poultry, birds, etc.....	0	0	0	92	0	7	1	0	1	3	2	0	0	0	8	5	9	7	0	0	11	146	
9. Through infected public highways.....	0	3	0	10	0	0	0	0	0	0	0	0	0	0	0	3	8	0	0	0	0	24	
10. Through contaminated streams or drinking water.....	0	0	0	1	0	0	2	0	0	1	0	0	0	0	0	3	12	0	0	0	0	19	
11. Through infected feed or garbage.....	1	0	0	0	1	0	0	0	0	3	0	0	0	5	1	1	9	1	0	0	0	22	
12. Other known sources of infection.....	0	0	0	7	1	0	0	0	1	2	0	0	0	1	26	2	13	0	1	0	1	0	55
13. Sources of infection unknown.....	2	1	0	140	67	5	0	6	1	12	206	3	1	6	6	9	130	1	0	0	1	6	603
TOTAL.....	33	12	3	768	120	48	6	84	56	98	272	32	3	50	180	222	904	59	8	1	22	40	3021

had been supposed to be clean territory and as a result it was necessary to eradicate the disease from the open range country where it had spread to a number of native cattle. As territory was cleaned and disinfected succeeding orders permitted each section to be advanced from closed to exposed area, from exposed to modified, from modified to restricted and eventually to free area. These advances were usually made at periods of 30 days each where no new cases of the disease developed.

The figures in the above table are compiled from statistics gathered in the field by the veterinarians engaged in the active work of foot-and-mouth disease eradication up to July 15, 1915. Every effort has been made to secure as accurate knowledge of the means by which infection was introduced into a herd as it was practicable to do, and while it is probable that some slight errors have been made, they would not materially alter the total results, as given above. It will be observed that the two most important factors in the spread of the infection were public stock yards and human beings. The transmission by the former method may be readily controlled by regulations, but the spread of infection by people offers many serious difficulties.

The notations "1," "2," and "3" are self-explanatory. Under item 4, however, should doubtless be added a number of cases charged under item 1. In a considerable number of cases, animals shipped from stock yards, apparently healthy when shipped and unloaded, but afterwards developing the disease, may have received the infection from the cars while en route, instead of at the stock yards from which they were shipped. As soon as the outbreak was discovered, however, the disinfection of stock cars was ordered, and it is not probable that many such cases happened after that date.

Under item 5, "From creameries," infection was chiefly carried to these creameries by milk from infected cows, and disseminated by the feeding of skim milk to other animals. It is evident that the number of such infections in Michigan is entirely too small since about one-half of the unknown sources of infection in that state, especially in Berrien County, have been closely connected with infected creameries, but they have not been so tabulated because the evidence was not sufficiently conclusive. As foot-and-mouth disease is not the only epizootic which is spread in this manner, need is shown for legislation requiring creameries to pasteurize any skim milk sent out for animal feeding.

Item 6, "Vaccination with infected virus" is explained elsewhere in this paper. A careful investigation was made by the Bureau of Animal Industry, resulting in the finding that all infections prior to August 8, 1915, was contained in the virus and not in the serum, with which the animals were vaccinated. A glance at this table shows the four states to which this virus was shipped.

Item 6, including (a), (b), and (c), presents one of the most interesting features of the entire outbreak. Out of a total of 3021 infected herds, 509 of the number were infected through virus carried upon the shoes, clothing or bodies of persons. Of the 604 "unknown" cases, it is probable that a considerable per cent of the infection was carried in this same way, making more than one out of every six cases infected as a result of this method of transmission. No stronger argument could be presented for the necessity of maintaining an armed guard on quarantined premises. Of the 41 cases, transmitted by practitioners and dairy inspectors, the larger part of the number occurred early in the outbreak, before knowledge of the outbreak existed. Although the most careful investigation has been made, no case has been found wherein the State or Federal inspectors engaged in the work of eradication have carried infection on their clothing or persons. This is due to the painstaking method of disinfection and fumigation enforced by the Department and the various states, and which is described in another part of this paper.

Under item 8, crows seem to have been the chief carriers, and careful study of their habits by a number of inspectors have brought out some interesting facts in this connection. In one instance at least, a band of crows have been followed by telephone and automobile for a distance of 35 miles. The habits of these birds in flying from place to place, alighting in cattle and hog yards, and running over the ground picking up small bits of manure or litter upon their feet, show how easily they may become carriers of such intensely infectious diseases.

Under item 10, no cases have been shown wherein infection was carried for any distance by streams, although infected litter has been carried to nearby pastures.

Item 11, "Infected feed or garbage," includes a number of cases where swine have been fed offal from slaughter-houses, later found to have been infected.

Under item 12, "Other known sources," is included twelve cases of reinfection on infected farms, after slaughter and disinfection.

While this percentage is very small, careful inquiry was made as to the probable cause of such reinfection. Printed reports covering the disinfection and restocking of these premises were requested of all inspectors in charge of reinfected premises. This investigation disclosed the fact that in each instance the work of disinfection was conducted on these premises during very cold weather, or at a time when snow and slush covered the infected ground. In this way, virus which had been tramped into the ground, or had lodged in concealed corners, was protected from the action of the disinfectants used. Later, as the weather grew warm, and the premises were restocked, this virus was uncovered and was the source of reinfection.

Among other known sources are included infection from railroads passing through or near farms, from which infected litter fell, the use of feed bags from infected premises, the employment of a common pasteurizing plant, use of milk utensils that had been on infected premises, etc.

Under item 13, "Unknown," 603 cases are placed. Of this number 206, or over one-third, are in the State of Michigan and Indiana, and are chiefly cases which became infected before the work of eradication was started. While about one-half of the latter are believed to be due to creamery infection, the remainder were probably carried in almost every known way, and if added to the number under the proper item would hardly change the ratio of the entire table. Many of the herds carried under this item in other states have doubtless become infected through the activities of persons in visiting other infected premises, but this could not be established by the inspectors. To this list, too, must be added the cases of infection carried many times by birds, rats and other small animals, of whose movements no records could be kept.

The susceptibility of swine to foot-and-mouth disease has been thoroughly demonstrated during the recent outbreak, and the tendency of these animals to have the disease in a mild and atypical form has resulted in numerous unpleasant complications and extensions of the disease.

The lesions of this disease in swine are not always readily discovered by the casual observer. Stomatitis, especially in the necrotic form, is a common sequence of hog cholera, while traumatism of the feet, especially contusions of the plantar cushion, are frequent in swine which have been driven or shipped. For these reasons little attention is paid by the owners of swine to these symptoms, and

unless the herd is located within suspicious territory of foot-and-mouth disease may continue in a chronic form for a considerable length of time before discovery. The danger of course lies in the ability of these animals to disseminate the disease.

This is the condition which existed at the beginning of the outbreak in Michigan, later permitting the infection of the Chicago and other stock yards, still later found to exist among large numbers of swine in the outskirts of Philadelphia, and which has again been responsible for a new outbreak after all territory was believed to be free from the disease.

On July 29, since the above table was prepared, foot-and-mouth disease was discovered to exist in a herd of 20 cattle within the city limits of Hornell, Steuben County, New York. As no known cases of the disease had previously been found within a radius of over 75 miles, the source of the infection remained a mystery until two days later, when 125 swine, divided among five herds, were found infected within a half mile of the first-discovered premises. These swine had evidently had the disease in a mild form for a considerable length of time as new horn on all four feet of many hogs had grown half-way down. Infection had been carried from these hogs to the cattle through drainage.

As no previous infection had been discovered on a farm since May 11, and in a slaughter house since June 16, the report came as an unpleasant surprise, but emphasizes again the need for continued careful supervision of all live stock in previously infected areas, especially large herds of swine.

Veterinarians should endeavor as far as possible to make occasional examinations of districts containing swine in any considerable numbers, in order to prevent if possible a repetition of these conditions.

On August 8 another herd containing 24 cattle and 3 hogs was found infected in Steuben County, 20 miles south of the infected farms above-mentioned. The owner of the former farm had motored to the vicinity of these farms 8 days before his cattle developed the disease, which is the only plausible explanation of the source of this infection. The milk from this herd was used by a cheese factory with 44 patrons, and farms of the latter have been located and are being systematically inspected. It will be quite remarkable if some of the herds of these patrons do not develop the disease from infected whey carried back to the farms for feeding purposes.

On the same date, August 8, foot-and-mouth disease was discovered among 119 hogs and 4 cattle at Wheeling, Cook County, Ill., 22 miles north of Chicago. No definite conclusions are warranted at this time but suspicion has been cast upon a batch of hog-cholera serum which had been prepared in Chicago last October at an establishment where the disease was not known to exist at any time. The serum was kept in cold storage, preserved in 0.5 % carbolic acid, and not used until after the quarantine restrictions had been removed following the negative test experiments on 10 hogs. This batch of serum was used in six Illinois counties and one county each in Indiana, Michigan, and Minnesota. The hogs in this Minnesota county and four of the Illinois counties developed the disease by August 11 and have been disposed of in the regular manner. The hogs in the Michigan county were appraised, slaughtered, and the premises disinfected before any of the disease developed in order to prevent the occurrence of new centers of infection. This procedure was also followed in the two remaining Illinois counties but the State officials of Indiana refused to adopt this recommendation with the result that the vaccinated hogs in Posey County, Indiana, developed the disease on August 16.

It is to be expected that a few scattering cases of foot-and-mouth disease will still be reported from time to time, but as long as even these sporadic and quickly controlled occurrences continue, the epizootic cannot be considered as entirely over. Carelessness may now undo the work of ten months and force the country to face once more the greatest danger that has ever threatened its live stock. By the immediate slaughter of all animals known to have been exposed to the infection, by the thorough disinfection of all premises and articles that might harbor the contagion, and by the imposition of Federal and State quarantines, the disease has been brought under control. These measures must be persisted in, however, until the last atom of infection has been destroyed beyond a doubt.

(To be continued)

LUPINOSIS OF HORSES AND THE TREATMENT*

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The word "lupine" is derived from the Latin word "Lupus" which means wolf. The French applied the word to a certain class of plants because of their tendency to impoverish the soil. Lupines, then, from the first uses of the word, are leguminous plants of the order *Lupinus*. Some species are cultivated as forage plants, the seeds of some are used, as pulse, for food, and several species are actively poisonous.

Lupines are herbs with palmately compound leaves, stipules adherent to the base of the petiole, flowers showy and in long dense racemes, calyx deeply toothed and two-lipped, corolla with an ovate standard, margins reflexed, wings oblong or obovate, lightly cohering and inclosing the keel which is incurved or beaked, stamens monadelphous, anthers of two-forms, pistil with an incurved style and sessile ovary, and pod flattened. There are about one hundred species in the temperate regions; and a few less in the warm regions.

Lupinosis is a disease often fatal and ascribed to poisoning by lupines or by the chickpea. It is a disease among sheep and horses especially, and is caused by eating the seeds and straw of the lupine. Cattle and goats are also susceptible and the dog has been poisoned experimentally. There are many species of the lupine growing in various parts of the United States, although the yellow lupine (*Lupinus luteus*) is supposed to be the most toxic. The nature of the toxic agent found in the lupines has not yet been determined. Arnold and Schneidemuhl succeeded in isolating a chemical poison and gave to it the name lupinotoxin. They described its physical properties but failed to determine its chemical composition. Attempts to associate a fungus with the plant have failed. Lupinosis is characterized by jaundice, acute yellow atrophy of the liver, and parenchymatous inflammation of other internal organs.

The disease appears in either the acute or chronic form. In the acute there is hurried and difficult breathing, rapid pulse, stupor, vertigo, and not infrequent swelling of the lips, ears or face. The initial temperature may be as high as 104° to 106° Fahr., but it is intermittent and gradually falls just before death. The pulse may reach 130 per minute and the respirations 100. A bloody

* Presented at the meeting of the A. V. M. A. Section on Medicine. Oakland, Cal., Sept., 1915.

froth may issue from the nostrils. Icterus which may be detected in the conjunctiva and the urine, usually appears on the second or third day. In certain cases this latter symptom fails to manifest itself and therefore is not constant. There is grinding of the teeth and sometimes trismus. The animal apparently prefers the recumbent position, extends the head on the ground and seems entirely oblivious to all surroundings. At first there is a constipation, the feces being hard and scanty and covered with yellow mucus. Later diarrhoea may set in and the excreta be tinged with blood giving it a dark brown color. Emaciation develops rapidly. In case of recovery the symptoms gradually abate and improvement takes place slowly. Cachexia is a common sequel. In the chronic form the symptoms are not so violent. Inflammatory tumefaction of the lips, eyelids, and ears with the formation of ulcers and scabs is described by various writers.

COURSE: Death may supervene within twenty-four hours to forty-eight hours, although frequently the disease lasts four or five days. The immediate cause of death is emaciation and extreme weakness.

LESIONS: The cadavers are emaciated and decompose rapidly. The muscles are of a grayish yellow color, the fibers having become fatty and having lost their striations. The subcutaneous tissue of the abdomen, and the omentum and mesentery are yellowish. The most important lesion in both the acute and chronic forms is found in the liver. The alterations in this organ are those of acute hepatitis. The liver cells have become swollen and granular on account of the parenchymatous change, or they may be more or less completely degenerated into fat. The gland is soft and friable and may be somewhat swollen. The interlobular connective tissue is greatly increased in amount due to inflammatory hyperplasia. In the course of a few days the liver undergoes acute yellow atrophy as a result of the absorption of the degenerated cells and the contraction of the hyperplastic stroma. In the chronic form the changes are those of chronic interstitial hepatitis. The icterus is of hepatic origin and due to catarrh of the bile ducts. In sheep, the gall bladder is distended with bile and its lining membrane is congested and swollen. The kidneys and bladder may show changes, more or less marked, due to inflammation. The bladder is, as a rule, empty. In the digestive tract we observe frequent yellowish discoloration of the mucosa, hemorrhages in the small intestine with catarrhal lesions of the entire canal. The heart is

pale and pliable and the blood which it contains is dark and thick. Capillary hemorrhages are quite generally observed throughout all of the tissues.

By the foregoing discussion, it is evident that the liver is the primary organ to become affected in lupinosis; and consequently there must follow a series of conditions and symptoms corresponding with the stage of degeneration of that organ. Just so much as the function of the liver is retarded, there will be a corresponding auto-intoxication of the entire system, with progressive degeneration of other organs in proportion to the diseased condition of the liver.

HISTORICAL: Isolated cases of lupinosis were seen about 1860 in northwestern Germany by Wienands, Liebscher, and Guttlich. The first observations of lupinosis taking an enzootic course date from 1872. They became more and more frequent till 1875. At that date, at the request of the Prussian Minister of Agriculture, researches were begun in the veterinary schools of Berlin and of Hanover, in order to determine the nature of the disease.

The regions where lupinosis made its first ravages were those whose soil is particularly favorable to the culture of the lupine in Prussia, Pomerania, and in the provinces of Posen and Brandenburg; later it reached Hanover, and finally all northern Germany. It is unknown in southern Germany.

The losses to agriculture in Germany caused by lupinosis were considerable. Often one-half to three-fourths of the flocks attacked died. In some districts of Pomerania its annual mortality amounted to several thousand sheep.

The first recorded study of lupine poisoning in America was that made by Chestnut and Wilcox while operating in Montana. There they found cases, in 1896, of poisoning in sheep both from grazing on the public range and from feeding on lupine hay during the following winter. They reported a number of cases where several hundred sheep died from acute lupine poisoning in Montana during the summers of 1898 and 1900. They also have on record a few cases of acute poisoning of horses on lupines. With the exception of the Germans, Wilcox and Chestnut are the only ones mentioned in available literature who have recognized lupine poisoning of horses and given complete reports of the symptoms and pathological lesions. All other text books appear to have drawn their information on this subject from the German texts.

The United States Government bulletins recognize the fre-

quency of lupine poisoning of sheep, and invariably add that horses, as well as cattle and goats, may be poisoned thereby; but that horses do not eat of lupines unless they are starved to it.

About the first of October of last year there were several horses on the farm of the Ranchland Company, at Gregson, Montana, that showed various degrees of illness. Mr. W. L. Irvine, Manager of the company requested that I make an investigation of the cause of their sickness. After looking over the farm, there was nothing to be considered for cause except lupines, of which there was an abundance in the plowed fields and in the pastures. The ranch consisted of three thousand acres of land, and there were some fifty-five horses and a few cattle kept there.



FIG. 1.

Twenty-five head of horses ran in a two-hundred acre field of summer fallow, which had an opening into a wild grass pasture, from July until October. Of these, a number were worked during the day and returned to the pasture nights. In addition to the "wild peas" there was considerable volunteer grain which, however, disappeared with the early frosts; but there remained an abundant growth of flowered and seeded lupines. The horses ate of the lupine plants freely and the owners supposed it to be good feed. The plants remained fresh and green in this plowed field until the first of November.

The specimens sent from the Gregson farm to professional botanists, including the division of the United States Department of

Agriculture on poisonous plants, were classified as *Lupinus argenteus argophyllus*, *Lupinus sericeus*, and *Lupinus flexuosus*.

On October 14th, 1914, we placed a horse in a box stall and began feeding him a full diet of lupines, gathered fresh each day. The lupines were not weighed, but fed *ad libitum*. The horse consumed from two to three burlap oat bags full each day until October 22th. This is the record: October 14th; experiment lupine horse, B. G., 10 yrs. old, 1400 lbs., ringbone right front, quiet and gentle, temperature 100, pulse 48, eyes clear and pupils normal. October 20th: temperature 100, pulse 36, pupils dilated and horse very nervous. When one entered the stall he would jump to the opposite side, throw up his head and snort and stand trembling when cautiously approached. The pupils remained dilated when exposed to an electric light. After several days the nervousness gradually subsided and was succeeded by stupor or sluggishness. As the lupines were becoming scarce by the effects of the freezing nights, it was decided to administer a decoction of the plants which was done on the 22th. The results of this showed temperature 99.4, pulse 36, respiration normal. About four gallons of infusion of the lupine was administered through a stomach tube at 1:00 P. M. At 2:00 P. M. there was extreme nervousness, trembling of the voluntary muscles, dilated pupils, temperature 101.6, pulse 34, respiration accelerated. At 5:00 P. M., temperature 102.5, pulse 76, rigors considerably subsided. On October 30th; temperature 103, pulse 90, hair staring, eyes dejected, purging with liquid feces, horse in stupor, lying most of the time but with occasional colicky pain and he refused to feed. November 1st: temperature 103, pulse 72. November 2nd: temperature 103.4, pulse 72. There is marked jaundice on the visible mucous membranes; the horse shows an anxious expression, carries head low, leads with difficulty, and has the appearance of a very sick animal. He was turned into the summer-fallow field where he died on November 9th.

I held a post mortem on this horse about two hours after death and found the following conditions: subcutaneous connective tissue, peritoneum and mesentery yellow; liver dense grayish yellow, friable and easily torn; weight 25 lbs.; kidneys weighed three and one half and four lbs.; they were very soft and friable. The heart was slightly enlarged, yellow and the muscles quite flabby. There was a quantity of purulent fluid in the chest cavity of this horse for which I am unable to positively account. It is possible that some of the decoction entered his lungs at the time of administration through

the stomach tube, but there was no evidence of it at the time,—such as coughing and difficult respiration with rales. It is very likely that the cold nights, to which he was exposed while refusing to feed, brought about this condition of empyema.

Specimens of the organs of this horse together with those of two other horses, were sent to the Kinsley laboratories at Kansas City, for examination. Dr. A. T. Kinsley gave the findings on this case as follows: "The microscopical examination of the liver shows marked atrophy, fatty changes and pigmentation and a slight lymphocytic invasion. The heart muscle shows cloudy swelling, the kidneys show inflammation and slight lymphocytic invasion; the serous membrane shows lymphocytic invasion in the subserosa."

On November 14th, I autopsied a gray mare on the Gregson farm, which was the first one having shown sickness in 1914. This animal had not completely shed from the previous year and had shown attacks of vertigo since August. The animal was cachectic when shown to me on October 1st, and continued to decline until she died on November 14th. The post mortem findings are as follows: the subcutaneous tissues showed dark yellow deposits, which also characterized certain other connective tissues; the liver gray and brown mottled, hard, tough and leathery, thickened in certain portions, and shrunken in others. The kidneys were hard, with capsules attached; heart enlarged, flabby, and containing a well organized thrombus in the right ventricle, which extended into the pulmonary artery. The stomach, duodenum and small intestines showed catarrhal inflammation. There were a few bots in the duodenum and great numbers of sclerostomes in the large bowels. There was thrombosis of the great mesenteric artery; but the lumen was not completely closed. The ovaries were enlarged.

Dr. Kinsley's report on microscopical examination: "Liver, marked fatty degeneration and a slight pigmentation; kidneys, marked atrophy and pigmentation; heart, marked pigmentation, which is indicative of inflammation; ovary, hyperemic corpus luteum."

On November 17th, 1914, I autopsied a black mare belonging to Sherman & Reed of Butte, Montana. The animal had been ill for a year, and was taken so while on a lupine pasture in the Big Hole Valley, some thirty miles south of the Gregson farm. Post mortem findings: liver unusually hard and leathery, irregularly thickened and shrunken, both kidneys enlarged, dense, and marked by parenchymatous degeneration; ovaries enlarged and hard.

Dr. Kinsley's report on microscopical examination: "Liver shows fatty degeneration, pigmentation and a marked lymphocytic invasion around the bile ducts; ovaries show oophoritis and lymphocytic invasion; kidneys show nephritis with lymphocytic invasion."

Seventeen horses had died on the Gregson farm by the first of April 1915 and I autopsied fifteen of them. The same character of lesions were found in all of these cases. However, some contained large numbers of sclerostomes in the large bowels and a number showed organized clots in the heart. One case, a gray mare six years old, which died on January 17th, had a small fibrinous clot the size of a hen's egg suspended to a pedicle a half inch in diameter and long enough to permit the thrombus to lodge in the aortic orifice. It was firmly attached to the chordæ tendineæ of the bicuspid valve. This animal showed frequent attacks of vertigo for several weeks before she died. There was a marked valvular insufficiency with a general cachexia reaching an extreme degree.

Of the horses affected on the Gregson farm, cachexia was a common characteristic, but some died in apparently good flesh with a rapidly formed heart thrombus. Valvular insufficiency was a common symptom. Upon the information gained from Dr. Kinsley's report, that lymphocytic invasion was a constant condition in the specimens of the three horses examined by him, I decided to make blood counts of the affected horses. During February I made counts on a number of the horses and found the red corpuscular count to run from seven to nine million per cubic millimeter and the white from twenty to thirty thousand. A number of the apparently healthy horses showed leukocytosis. On March 11th, I made blood smears of 37 horses on the Gregson farm, and Dr. Caroline McGill, pathologist at the Murray Hospital, Butte, Montana, made the differential blood count. We used the following percentages for the approximately normals and all horses that differed materially from these percentages were isolated as being probably diseased: Lymphocytes & large mononuc. 34%; neutrophils, polymorphs. 61%; eosins, 3.6%; mast. 0.2%.

By this count sixteen horses were shown to be more or less diseased. Nine showed it by clinical symptoms, five by certain degrees of cachexia and two by well marked valvular insufficiency. No. 15 gave the following differential percentages: Lympho. and large mononuc. 89%; neutroph. 61%; eosins 2%; mast. 0%. This animal died four days later and the post mortem showed: yellow tissues, liver, spleen and kidneys enlarged; heart enormously enlarged and

with a well organized clot in the right ventricle and pulmonary artery; gastro-intestinal catarrh, with an ulcer in the glandular portion of the stomach and one in the double colon.

No. 16, R. M. 15 yrs., 15½ hands, is a very interesting case and I will take just enough of your time to detail the course of study on this animal and use it to illustrate the results obtained on the other sick animals on this farm.

Because of the constant post mortem findings of liver degeneration followed by the degeneration of the other solid organs, it was decided to try treatment on the fourteen horses as indicated by the leukocytosis on the Gregson farm and accordingly these animals were placed on the treatment of artificial Carlsbad salts. This treatment was used because of the action of the salts in increasing the normal functions of the liver, and also on account of the cheapness and the ease of administration. Each horse received two tablespoonfuls of the salts night and morning in a quart of oats. The treatment was begun on April 2nd and continued for four months with the result that the horses began to improve in general condition about the fourth week of the treatment, and in two and a half months were normal in physical condition as well as in proportion of blood corpuscles.

R. M. No. 16, at the beginning of the treatment in March, showed extreme cachexia, pale mucous membranes, and a marked valvular insufficiency. She was too weak and short of breath to go faster than a walk. She began to show improvement about the fourth week of the treatment and had gained so much by the middle of June that she was put to work and has done her work in the field ever since. (Fig. 2). Her blood counts were:



FIG. 2.

	Differentials:			
	Lympho. & L. Mono.	Neutro. & Poly.	Eosins	Mast.
Mar. 11	9%	89%	2%	
July 21	29%	69%	1.5%	.5%

White Corpuscles

Mar. 28	20,300 per m.m.
May 10	14,700 per m.m.
July 21	9,700 per m.m.

The leukocytic counts were continued weekly on all of the fourteen horses except three, numbers 4, 8, and 9, which were removed to another farm fifty miles distant. Although these three had received good care and feed, they had received no medical treatment and were reported not to have improved in general condition. On May 10th I made the counts of the leukocytes and found an increase in two of the horses and a slight decrease in the other one; but these animals had not begun to shed and had made no gain in flesh. These three horses were then put on the treatment of artificial Carlsbad salts and have made satisfactory gains since.

On June 17th, 1915, I placed a horse in charge of Mr. Elden Roth, who lives four miles north of Missoula, for the purpose of testing the effects of lupines in this locality. The plants were gathered from the Crescent Dairy ranch and were classified by the Montana State Experiment Station as *Lupinus leucophyllus*. Only mature lupines were fed and the horse consumed approximately fifty pounds each day for the first week, after which he ate somewhat less. At the end of the three weeks, he was eating about twenty-five pounds per day and continued to take that amount until the end of the experiment. The horse was, at the beginning of the experiment, in good flesh, of a rich brown color and was apparently healthy. Following is the record of the experiment in feeding lupines: June 17th, Br. G., 15 yrs., 15½ hands, weight 1,000 lbs.

	Temp.	Pulse	Leucocytes	Red Corp.
June 17	101.2	48	17,800	9,000,000
July 1	99.6	38	21,500	8,600,000
July 13	98.4	30	22,000	7,500,000
July 30	99.5	32 (12:00 M.)		
July 30	98.4	42 (4:00 P. M.)		
July 31	97.4	26 (12:00 M.)		
July 31	98.5	48 (4:00 P. M.)		

On the seventh day of the experiment the horse appeared full. He was eating well but drank only about one gallon of water per day. The pupils were well dilated in the ordinary light of the stable, but contracted when exposed to bright sun-light. The feces were dry and passed in hard pellets. Mr. Roth said he noticed certain nervous movements when handling the horse and a quivering of the muscles could be felt under the hand.

On the tenth day there was a marked jaundice of the visible mucous membranes. The horse was refusing to drink water and the hair was erect.

On the fourteenth day the horse appeared to be a hundred pounds lighter in weight than he was the week before, hair staring and dry, membranes icteric, feces passed in pellets covered with



FIG. 3.

mucous, some edema of the lips, sheath, abdomen and limbs. The heart sounds, dull and the horse was stupid. He had not consumed more than three gallons of water for a week.

At the end of the third week of the experiment the horse was an object of pity, a typical case of cachexia. Fig.3. The skin was peeling under the hair and there were rolls of scurf accumulated on either side of the dorsal region. The sphincter ani was relaxed and the hairless skin appeared to be shedding its epithelium. The horse appeared to be suffering from exhaustion, carried the head low, and

walked with an uncertain movement of limbs and body, ate of the lupines with fair relish, but evidently craved some other food as he began biting the trough. He still refused to drink more than a few swallows of water. He was drawn in the flanks and the ribs were prominent.

At the end of the fourth week, the horse seemed to be in about the same condition; the membranes were not quite as icteric and the senses seemed a little brighter; the cachexia was more pronounced.

During the last two weeks of the experiment the horse was given about half the normal feed of baled timothy hay mixed with fresh lupines. "*It is of special interest to note that he picked the lupine peas out from among the hay and ate them first.*"

On June 30th I administered four gallons of a strong decoction made from freshly gathered mature lupines. The solution was given through a stomach tube at noon. There was very little change in the condition of the horse as a result of administering the lupine solutions, although he appeared weaker and more depleted the following day.

On August 4th I destroyed the horse by severing the left carotid artery and held a post mortem immediately after death. The subcutaneous tissues were intensely yellow; the thoracic and abdominal muscles anemic, pinkish in color, soft and flabby; the peritoneum and mesentery were yellow as saffron; the liver grayish yellow; spleen enlarged and firm; kidneys and heart normal, except there was a small fibrinous clot, about the size of a man's thumb, attached to the bicuspid valve. There was a well marked catarrhal inflammation of the stomach and small intestines with some hemorrhages showing in the intestines. There were a number of areas a half inch in diameter of denuded squamous epithelium along the cuticular ridge of the stomach. The brain showed congestion of the superficial vessels of the cerebrum and cerebellum.

The microscopical examination of the organs of this horse was made by Dr. Caroline McGill of the Murray Hospital, Butte, Montana, and the findings were as follows:

"Pathological Examination of Tissues from Br. G.

Experimental lupine horse:

SPLEEN:

Gross:—Hard, fibrotic, pigmented.

Microscopic:—Marked decrease in the number of lymphocytes.

Malpighian bodies much decreased in size; pulp slightly congested. Mild pigmentation of reticular cells. Capsule and trabeculae normal except for mild pigmentation.

LIVER:

Gross:—Light yellow, fatty, pigmented, hard.

Microscopic:—Lobules distinct. Rather marked round cell infiltration around the portal canals. Mild general pigmentation of liver cells. Marked pigmentation of cells just beneath the capsule, and in places at the periphery of the lobules. Mild cloudy swelling. At center of the lobules there is some fatty degeneration. Epithelium of bile ducts intact.

HEART:

Gross:—looks normal.

Microscopic:—Mild lymphocytic invasion about vessels, otherwise normal.

INTESTINE 1.

Gross:—Shows small nodule 3mm. in diameter just beneath the serosa.

Microscopic:—The epithelium of the mucosa is eroded. Most of the villi have sloughed. There are more lymphocytes than normal in the mucosa. Many of the cells of the glands of Lieberkühn are degenerated. Lymphocytic invasion of the submucosa. Many lymphocytes in the muscularis. The nodule noted in the gross beneath the serosa is a mass of lymphocytes.

INTESTINE 2.

Microscopic:—Some villi have not sloughed but all surface epithelium is gone. Less lymphocytic invasion than in number 1.

KIDNEYS:

Gross:—Except for mild pigmentation, are normal.

Microscopic:—Marked lymphocytic invasion, especially about the blood vessels. Cloudy swelling of the epithelial cells, especially those of the convoluted tubules. Some of the cells are slightly pigmented. Marked increase in fibrous tissue.

BRAIN:

Medulla:—Section seems entirely normal except for slight congestion.

Cerebellum:—Nerve cells normal. Mild congestion.

Cerebrum:—Normal except for slight congestion.

I have been unable to find any published records of chronic lupinosis of animals in America and the information disseminated by authorities is to the effect that sheep only are subject to the disease and then only when they are in a very hungry condition. Private correspondence with authorities relative to the poisoning of the horses on the Gregson farm, several months ago, brought the report that "horses do not eat lupines unless starved to it and are therefore not poisoned on the range." In a subsequent letter, the

same authority stated that "if the horses on the Gregson farm had eaten the lupines as freely as was stated and were showing the symptoms described, it was very likely that they were suffering from chronic cases of lupine poisoning."

The following is a copy of a letter sent out by the local District Forester's office to all sheep permittees in September, 1914:

To Sheep Permittees:

"I wish to call your attention to the following letter from Dr. C. Dwight Marsh, in charge of the poisonous plant experiment station maintained by the Forest Service in co-operation with the Bureau of Plant Industry at Greycliff, Montana.

"We have noticed that in ordinary years a large proportion of the lupine pods are aborted. This year on the ranges we have seen that there is an unusually large number of perfect pods. Inasmuch as stock poisoning results largely, if not entirely, from eating the pods and seeds, there is reason to believe that the lupine is more dangerous this year than in the average year. There has already been one heavy loss on the Absaroka from this cause. I think it would be well if you would warn your permittees, so far as you have opportunity, to see that their herds never have an opportunity to eat largely of lupine. Sheep should never be turned in a lupine patch when hungry, for then they are almost sure to fill up on it with disastrous results. Especial care should be taken when sheep are shipped from one point to another, and put on a strange range. It should always be remembered that it is the hungry, close herded sheep which are most likely to eat largely of poisonous plants."

My observation is that horses, as well as cattle, eat freely of lupines in all stages of its growth and that they eat it more freely after other forage has dried up. I have seen horses feeding on the tops of the mature lupines as though they relished the peas. Stockmen report that horses eat lupines on the range, and the general opinion among stockmen is that it is good feed for horses and cattle. Mr. Irvine reports seeing his suckling colts feeding on the lupines while following the work mares in the field.

Lupines grow abundantly in the grain and hay fields, in the tame pastures, on the public ranges throughout the Rocky Mountain region of Montana. The plants near Missoula, which has an altitude of 3223 feet, matured the last of May. The first mature plants on the Gregson farm, altitude 5102 feet, were observed this year the first week in August. Lupines thrive in the mountains at an altitude of 9000 feet but I do not know that the plants mature at that altitude.

It is well known that lupines are more poisonous in some years than in others and in some localities than in others. The local Forest Service has had reports of acute poisoning of sheep, supposed to have been caused by eating lupines, during the years of 1907, 1909, 1913, 1914 and 1915.

Information as to the character of horse losses in western Montana shows that the losses from diseases have been by cycles, which usually cover a year's time. These losses have invariably been among the range horses and have been in acute, sub-acute, or chronic form. The laymen have been accustomed to call the disease "Mountain Fever" and the professional men "Swamp Fever." The year 1912-13 was a period of severe horse losses in western Montana. One man near Wisdom, Montana, lost forty horses out of a hundred and twenty head; another man near Missoula, Montana, lost twenty-five out of sixty head. The Missoula man thought the trouble came from a certain pasture and has not used that pasture for horses since. There have been heavy losses of horses in this locality during the past year, and several animals, which I have seen, have been diagnosed as swamp fever, showing extreme cachexia, in which the count of the red corpuscles ranged from five to seven million per emm., and the white from seventeen to twenty-two thousand per emm. Some of these animals which were placed on the treatment of artificial Carlsbad salts a few weeks ago are making satisfactory improvement at this time. I wish to state that one of the commonest symptoms of these chronic cases is valvular insufficiency.

The symptoms and lesions of the two horses used for experimental feeding of lupines were similar throughout and in many particulars identical. The most pronounced clinical symptoms in both horses was cachexia, which reached an extreme degree. The laboratory diagnosis of both was alike, in that there was fatty degeneration of the liver with pigmentation and lymphocytic invasion of other organs and tissues. Other horses which I have seen and autopsied in Montana, have shown the same character of clinical symptoms and identical pathological lesions. It is therefore established that horses have been affected with chronic lupinosis and died from the effects of the disease. It is probable that horses are frequently affected with chronic lupinosis when they are supposed to be suffering from some other disease.

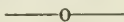
The fact has been established that horses have been poisoned in western Montana from the effects of eating lupines, that it pro-

duces a chronic inflammation of the liver and a progressive fatty degeneration of that organ, followed by a like degeneration of the other solid organs. Auto-intoxication, indicated by general cachexia, frequently accompanied by valvular insufficiency and attacks of vertigo usually resulting in complete prostration and death.

The success obtained by the use of the artificial Carlsbad salts in treating diseased horses on the Gregson farm has encouraged its use in trying the treatment on range horses. Several bunches are now being treated with full confidence that further losses among them from lupinosis will be prevented.

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ABSTRACT OF DISCUSSION.

DR. LYMAN: I notice that the first reading of temperature was a hundred and one and a fraction, then from there the temperature diminished to ninety-eight or thereabouts.

I think it is quite a general opinion that the temperature of horses varies in different parts of the country, and I would like to ask the Doctor, for my own information, what he considers the normal range of temperature of horses through that section of Montana. That might have some bearing upon the temperature that he recorded.

I think the Doctor brought out a very interesting feature, to me, at least, the fact that these animals do eat lupine at other times than when they are hungry.

It is a general opinion among a number of people that animals only forage upon that plant when they are hungry, but the Doctor has shown that they pick the pods off by preference.

DR. KNOWLES: The average temperature of horses runs from one hundred to one hundred and one in Montana, I think.

This horse had traveled twelve miles and had stood about four hours when these first records of mine were taken. But ordinarily the horse would be normal in that length of time if his temperature was at all elevated. I assume that the first temperature given was the normal.

I find many horses will run a normal temperature of one hundred and one, and from a hundred to a hundred and one is about the average normal in Montana, so far as my experience goes.

DR. TYLER: The Doctor, it seems to me, has disproven a number of facts which have gained permanency.

I take it, in speaking of the up-range as the disease progressed, and the cachexia becomes normal, the temperature is inclined to sag and then becomes normal. Whether that is due to the progressive cachexia and exhaustion, I do not know. I would like to hear it discussed by men living in the territory where the plant is plentiful.

The Doctor diagnoses this as "Swamp Fever", and it is a fact that his post-mortem findings co-incide with my observations along that line; but so far as I was aware, we had no lupine in that territory, although possibly I may have overlooked it, as I never made any particular search for it.

I would like to have the Doctor's personal opinion as to whether he considers that there might be a confusion of the two diseases, or whether they are one and the same.

DR. I. E. NEWSOM: As to all the seeds of lupine being poisonous, I would like to ask if that is the idea he has gained from such work as he has done on this subject?

DR. KNOWLES: I find in all of these cases,—the temperature became sub-normal in advanced cachexia or in well-developed cachectic cases.

In both of our experimental horses, the temperature went down and the pulse, apparently corresponding with the amount of intoxication that the horses sustained from the alkaloid of the plants.

That was one of the conditions studied in the sick animals in that locality in comparison with the horses that we used for test or experimental cases. Finding that the temperature and pulse and blood counts ranged correspondingly, according to the symptoms or stage of the disease, with "Swamp Fever", I would say that I, along with other practitioners of Montana, have been of the opinion that we have had "Swamp Fever" very commonly, great numbers of horses dying of "Swamp Fever" in different years. The conditions or the symptoms were the same as I have described, and I am of the opinion that we had this condition instead of having "Swamp Fever". We have had a number of horses in my own and other veterinarians' practice,—cases where other veterinarians tried treating their horses in the same way that I have indicated, and from what we know of "Swamp Fever" this does not correspond; and it was almost conclusive proof that they did not have "Swamp Fever". Some practitioners have, during the past few years, had some horses recover from what they believed to be "Swamp Fever".

Therefore, from these experiences, and inasmuch as the lupine plants are so abundant all over the mountainous regions of Mon-

tana, it is more likely that our horses have been getting these poisons during the period when the plants were thrifty, and that they have not shown the symptoms for some weeks or even months afterwards, when the liver had become so badly diseased that it had lost its function and the horse began to break down on that account.

As to the relative poisonous qualities of the pods or seeds and the other parts of the plant, our experience did not take into account. We did not feed anything except what had the seeds on them; we fed the whole plant. I had considerable correspondence with the Department of Plant Industry this year, and they maintain that they are now making a study, chemically, of the lupine plant, but are not yet prepared to give out any information along those lines.

DR. H. JENSEN: I am not very familiar with the lupine, but if this plant should produce a condition similar to "Swamp Fever", and then the animal should recover under the treatment of artificial Carlsbad salt, it would rather lead me to believe there was nothing in common.

The lupine must be a slow poison, because otherwise the animals would be carried away before the ordinary Carlsbad salts would be of any value.

I am bringing out these points as rather inconsistent with what is known of "Swamp Fever".

DR. CAMPBELL: Does "Swamp Fever" occur in the highlands of Colorado?

DR. I. E. NEWSOM: Yes, it is quite prevalent, and at an altitude of eight thousand feet and there is lupine there. However, I do not believe it was the intention of Dr. Knowles to give us the impression that Swamp Fever is, in fact, lupinosis. I think it is a separate disease, but some cases of Swamp Fever have been mistaken for lupinosis and vice-versa.

DR. KNOWLES: I do not mean to convey the impression that lupine or lupinosis and "Swamp Fever" are the same things. They certainly have no connection, and as for the lupinosis, it seems to be amenable to treatment, whereas "Swamp Fever" is not.

The object of the treatment of these animals, as stated in my paper, was to increase the normal functions of the liver. I do not think that the treatment used, as we have used it, would be considered an antidote for the alkaloid contained in the plant, because the animals were sick several months after they had the opportunity to eat the lupine, and they were being treated in order to increase the normal functions of the liver, in view of clearing up the cachetic condition.

Any alkaloid, fungus, or whatever it may be that will cause a lessening of the normal functions of the liver, will produce a cachexia, and if the liver is so retarded that the ferments and the antitoxic function, the lack of secretion of the bile, and its other

functions are held up, it leaves the animal to suffer from an auto-intoxication; also from an intoxication that goes into the system from the intestines, which would ordinarily be taken care of by the liver if it were in full action.

It was upon that basis that I conceived the idea of trying to treat these horses by a simple, cheap, and easily administered remedy that might become practicable and largely useful.

DR. CAMPBELL: I am sure we all feel that Dr. Knowles should be commended for accomplishing such original research work while in active practice. It is rather an unusual condition, I think. Likewise, he is to be commended (and I think this is the part where the practitioner—and the practical point comes in) for offering an applicable remedy.

Too often, it seems to us who are in practice that scientific men, in their research, work out the cause of something and offer us a treatment to avoid the cause. In nothing do we see this more frequently than in forage poisoning, which they say is due to feeding the animal a certain sort of forage, and then the remedy is to feed something else. That is proper in the city where everyone buys the forage, but in Illinois, where the poisonous forage—the kind that produces the disastrous results—grows on the lowlands—the man has only to sell that to the Chicago men and buy something else from them.

I might refer to parts of Southern Oklahoma, where all the forages are the same kind. You might as well tell a man to lead his horse out and shoot him as to send North for his feed. He cannot do it, and he would rather run the risk of loss.

The remedy suggested is very simple and much the same as I have seen used many times after eating mouldy forage, with about the same results.

I have seen Glauber's and Epsom salts used. Of course I do not mean to offer that as a remedy where the forage can be changed. There are localities where it cannot, and a medicinal remedy is desirable for the general practitioner.

THE CAUSE AND OCCURRENCE OF CONTAGIOUS ABORTION IN CATTLE*

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Contagious or Infectious Abortion Disease in Cattle, is the latest among the serious, destructive plagues of food animals to receive the wide recognition in this country its great economic importance merits. In Europe, probably because it has existed there longer and is of much commoner occurrence, the importance of the disease was recognized earlier than here. Its infectious character was suspected as early as the 18th century though not conclusively proved until the last quarter of the 19th, and its specific cause, the abortion bacillus of Bang, was not discovered and described until the year 1897.

How young our knowledge of the real character of abortion disease in cattle as it occurs in America is, and how slowly we recognize the identity of the disease in America and Europe and wakened to an adequate appreciation of its grave, economic importance, may be gathered from facts like the following:

In the year 1908, or only seven years ago, one of America's foremost authorities on veterinary pathology and bacteriology, in a text book on the pathology of infectious diseases of animals, stated, regarding the specific cause of infectious abortion disease, that "The investigations in the United States have failed to reveal the presence of Bang's organism, but instead a variety of *B. coli communis* has been found by Chester and by Law and Moore." (1)

In another text book on the infectious diseases of animals, published in 1912, or only three years ago, by one of the best known authorities and writers on veterinary subjects in America, the identity of abortion disease in this country and Europe is questioned, and the possibility suggested and discussed that each continent may have a distinct type of infectious abortion disease peculiar to itself. (2)

These statements, which show what prospective veterinarians were being taught about the etiology of abortion disease in our vet-

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erinary schools only a few years ago, are remarkable now mainly because of their evidential value to prove how young our knowledge of the true character of infectious abortion disease is, and they will not be charged too heavily against their authors by those who know that only five years have passed since the first account was published of the isolation in America of the real abortion bacillus of cattle. (3) the bacillus of infectious abortion of Bang, and that this event did not at once prove the identity of abortion disease in America and Europe, but at first only that European abortion disease of cattle had invaded America.

Among the infectious diseases of food animals, the importance of abortion disease in cattle is ranked today by many authorities as second only to that of tuberculosis, with the lamentable possibility in view, if its spread is not checked, that it may soon force tuberculosis into the second place. And yet, our appreciation of the magnitude of the evil is so recent, even among veterinarians, that a search of the Proceedings of the American Veterinary Medical Association for the years 1908, 1909 and 1910, reveals only one, purely incidental reference to it. Fortunately for the welfare of our livestock industry the Proceedings of the Veterinary Association for the years 1911, 1912 and 1913 prove that American veterinarians are giving abortion disease an increased, and an increasing, amount of attention.

The data I have available do not show when abortion disease was first imported from Europe into the United States, but this occurred many years ago, long before anyone in either this or any other country possessed the necessary knowledge to devise effective measures against its importation.

Statistics regarding animal diseases in America are too meager to prove anything. Reliable, comprehensive statistics, had they been available, would no doubt have called attention with sharp emphasis to the rapidly increasing frequency of abortion disease in the United States a score or more of years ago, and would have given the investigations now in progress an earlier start. They certainly would have aroused a wide interest which, we may assume, would have prevented the passage of more than 13 years between the discovery of the abortion bacillus in Europe and the final determination in America that abortion disease of cattle in Europe and America are identical.

Although it was not known that the bacillus of infectious abor-

tion in cattle is of common occurrence in the milk of infected cows until the year 1912, in which a bacillus, pathogenic for guinea pigs, previously discovered in and isolated from milk by Cotton and myself, was definitely identified by Mohler, Traum, Cotton and myself as the bacillus of infectious abortion of cattle. I believe the milk-injection tests with guinea pigs made in the Bureau of Animal Industry at different times during the last twenty years by Cotton, Brett and myself throw at least some light on the rapidity with which abortion disease increased among the dairy cows from which the District of Columbia draws its milk supply. In the year 1894, samples of milk from 19 different dairies were injected into guinea pigs. The samples from one dairy caused lesions which were very puzzling at that time, but which, owing to the precise description we have of their character, are now known to have been the lesions caused in guinea pigs by the bacillus of infectious abortion of cattle. In the year 1907, guinea pigs injected with 36 samples of milk from 32 different dairies proved that $12\frac{1}{2}$ per cent of the samples were infected with abortion bacilli, and that $15\frac{5}{8}$ per cent of the dairies were responsible for the infected milk. In the year 1912, guinea pigs injected with 77 samples of milk from 40 different dairies proved that 30 per cent of the samples were infected with abortion bacilli and that $37\frac{1}{2}$ per cent of the dairies were responsible for the infected milk.

If we take the frequency of abortion disease as it is indicated by these tests to be equal to one in the year 1894, we see that one has grown to three in the year 1907, or 13 years later, and to seven in the year 1912, or after the passage of another 5 years, or from one to seven in the course of 18 years. At the present time I can say that repeated tests with guinea pigs of the milk distributed raw or unpasteurized in the District of Columbia by almost any large dairy which draws its supply from a number of different farms, sooner or later show that it is from time to time infected with abortion bacilli.

I would like to have it clearly understood, however, that I have not given these figures because I look upon them as reliable evidence to prove exactly how much abortion disease has multiplied in a given number of years in the United States or any portion of the United States. The figures are adequate data only, together with the gradually increased frequency with which abortion dis-

ease in cattle has been reported from year to year, to show that the growth of the evil is actual and not imaginary, and that some very real measures are imperatively required to check it.

Now, having given this much attention to the occurrence and increasing frequency of contagious abortion disease in cattle in America, I will try to devote the remainder of my time to its cause.

The bacillus of infectious abortion in cattle, the abortion bacillus of Bang, is a short, non-motile, at times almost coccus-like rod. There are peculiarities about its growth on artificial media under laboratory conditions, its reaction with various stains, etc., to which I will give no special attention, because those who are interested in the subject will have little trouble to find elaborate and detailed published accounts.

In many respects the bacillus is a very remarkable organism. In cows as we know, it causes abortions, but it does not seem able to maintain itself anywhere in their bodies but their udders and pregnant uteri. In the udder of a cow it may persist for years and contaminate her milk without affecting her health in any determinable way. In guinea pigs it is less commonly an agent which induces abortions, but is a cause of vast, destructive changes in their livers, spleens, kidneys, testicles, bones, etc. (4) In rabbits it is claimed to cause abortions and is capable of maintaining itself in their bodies for long periods of time without causing macroscopic lesions. It is capable of living weeks and months in the bodies of such widely different species of animals as monkeys, pigeons, rabbits, rats, mice, guinea pigs and cattle, (5) and in the bodies of children it causes bio-chemic changes which can be detected by agglutination and complement fixation tests. (6) Whether the bacillus is economically important as a cause of abortions among other species of animals than cattle, I am unable to say but inclined to doubt.

Among the various special tests for abortion disease two have proved satisfactory, the complement fixation and the agglutination tests. The former is too complex for general use and the latter relatively simple and equally reliable. These tests do not prove that a cow has aborted or is going to abort; they simply prove that a cow is infected or is not infected with abortion bacilli.

The abortion disease investigations which are being made at the Experiment Station of the Bureau of Animal Industry by Dr. W. E. Cotton and myself have proved, among other things, that

some cows which have never aborted and which do not subsequently abort may expel abortion bacilli from their bodies with their milk, and that all cows which expel abortion bacilli with their milk react positively with the agglutination test, and that the agglutinating substance is present both in the blood and the milk of such cows. This is strong evidence to prove that a cow which has never aborted and seems to be absolutely healthy in every respect may be the cause through which abortion disease is unconsciously transported from one locality to another, or from an infected herd, either directly or indirectly, into a previously uninfected herd. It suggests strongly that the owners of herds of cows which have not been invaded by abortion disease should permit no new cows to enter their herds until an agglutination test has proved them free from infection.

But the mistake must not be made to rely on the agglutination test in selecting bulls. At the Experiment Station we have tested a number of bulls which had been used for varying periods of time to serve infected cows, and only two of these bulls reacted positively, and they were two which Cotton and I had given subcutaneous injections of abortion bacilli suspended in normal salt solution. It seems that abortion bacilli rarely get into the bodies of male cattle in a way that causes modifications which can be detected by any means we have at our command, but nevertheless bulls may play a very important part in the transference of abortion bacilli from cow to cow. It is easily conceivable that abortion bacilli may be deposited on the male organ of copulation, and when this is retracted into its sheath, find an environment in which they can multiply, strictly exterior to the body, and remain alive and virulent indefinitely. How important this mechanical part the bull may play in the dissemination of abortion disease is may be judged from the following observations made by Cotton and myself in studying three questions, namely, the persistence of abortion bacilli in the uteri and vaginae of cows after abortions; the possible appearance of abortion bacilli in the uteri and vaginae of infected cows during periods of œstrum, and the possible recrudescence of abortion bacilli in the uteri and placenta of cows at normal parturitions subsequent to abortions.

We found that the infected condition of the uterus and vagina of a cow after an abortion may persist as long as 7 to 8 weeks. This is in close harmony with the observations of McFadyean and Stock-

man, who established a period of about 30 days. Our tests, which are as yet far from complete, have failed thus far to show a reappearance of abortion bacilli in the uteri and vaginae of infected cows at periods of œstrum, but, concerning the recrudescence of abortion bacilli in the uteri, vaginae and placentaë of cows at seemingly normal parturitions which follow abortions, of 13 tests so far made 6 were positive. We also found that this recrudescence of abortion bacilli is not limited to normal parturitions immediately subsequent to abortions; our records show that it may occur as late as the third normal parturition following an abortion.

We may well ask, what chance, under these conditions, has the bull who is used to serve infected cows to escape becoming, himself infected but unaffected, a mechanical agent for the dissemination of abortion disease? And this should be taken, with good reason, as a sound argument against neighborhood bulls, and against the use of bulls in uninfected herds to serve a miscellaneous lot of cows that do not belong to his herd.

It is not difficult to see when we review the known facts about infectious abortion disease of cattle and the remarkable bacillus which is its primary, essential cause, why the disease has become widespread and strongly established in the United States. The fact alone that a large proportion of the cows which are attacked by the disease become and indefinitely remain carriers of its specific bacillus, a bacillus which is pathogenic in different ways for widely different species of animals, brings with it problems not easily solved.

Our methods of buying and selling cattle; our insufficient appreciation and use of modern tests to guard our herds against contamination through the introduction into them of seemingly healthy carriers of disease germs; our methods of permitting contact between animals at stock shows without first proving them free from contagious diseases, etc., together with other evils urgently need reforming.

I do not like to leave this subject without saying a few words in conclusion about the significance of the bacillus of infectious abortion as a parasitic organism which may attack human health. No proved disease germ is of commoner occurrence in cow's milk, and though no one has determined that it is truly pathogenic for human bodies, I do not believe that human health should be exposed to it. I believed at one time that it might be responsible in children

for adenoid proliferations and tonsillar troubles, because of the peculiar character of some lesions it causes in experiment animals, but Cotton and I on the one hand and Mohler and Traum on the other, were unable to prove this to be the case by testing a large number of diseased tonsils and many samples of adenoid tissue removed from the throats and noses of children by local surgeons and kindly presented to us, although Mohler and Traum found that the diseased tonsil of one child in their series of cases was infected with abortion bacilli.

Two years ago I presented a paper to the American Veterinary Medical Association on the relation of the abortion bacillus to the production of pure milk, from which I wish to quote one paragraph, as I believe it states concisely how we should regard the preventable exposure of human health to bacteria generally, irrespective of their occurrence in milk or other articles of food or elsewhere.

The paragraph is as follows:

We may say, relative to the bacteria against which human health should be guarded, that it is questionable whether exposure to a bacterium pathogenic for any species of mammals can be practised with impunity; that it is dangerous to permit exposure to any bacterium that is pathogenic for several species of mammals, though it may be, so far as we are informed, harmless for human beings, and that it is a deliberate invitation to disease to permit exposure to a bacterium, like the abortion bacillus, which is pathogenic for widely different species of mammals and is known to cause changes in human bodies that can be detected by complement fixation, agglutination or other biochemic tests or tests of any kind.

It is only necessary to add that pasteurization, which we need to protect our health against a variety of thoroughly proved milk-born evils, kills abortion bacilli in milk.

- (1) MOORE, *The Pathology of Infectious Diseases*, Third Edition. Revised and Enlarged, 1908, p. 525.
- (2) LAW, *Veterinary Medicine*, Third Edition, 1912, Vol. IV, pages 473 to 477.
- (3) MACNEAL & KERR, *Journal Infectious Diseases*, Vol. 7, 1910.
- (4) SCHROEDER & COTTON, *B. A. I., Circular No. 216*.
- (5) FAYBAN, *Journal Med. Research*, Vol. XXXVIII, No. 1.
- (6) SEDGWICK & LARSON, *Amer. Jour. Dis. Children*, Vol. 10, No. 3.

THE BRITISH ARMY VETERINARY SERVICE

N. S. MAYO, Chicago, Ill.

In the August number of the Nineteenth Century Magazine, under the title "Cinderella of the Service" there is an excellent article by E. G. Fairholme on the work of the British Army Veterinary Corps during the present great war.

This article makes unusually interesting reading to an American for in giving a brief review of the British Army Veterinary Service it brings home to us the glaring, almost criminal, inadequacy of the present United States army in this particular.

In considering the question of transportation on the western front of the great war, it must be remembered that conditions there are unusually favorable for mechanical transport as the country roads are probably as fine as in any other region of the world. Yet, the author says, "Horses cannot be superseded. Mechanical haulage, though it has done much to relieve the draught horse in modern warfare, has by no means superseded him. Cavalry and artillery horses are still absolutely essential wherever ploughed land, ditches or hedges have to be traversed. Here the motor-cars, motorcycles and armored trains are helpless. One million horses, it is estimated, are now in use throughout the regions that are the scenes of the present gigantic conflict."

The article is too long to be reproduced here but the following quotations are presented:

After visiting eleven special centers of veterinary activity he says, "The Army Veterinary Corps with its wonderful organization is doing a stupendous, humane and economic work in the merciful destruction of horses badly wounded and the restoration of thousands of others fit to carry on the work. It is a magnificent work humanely and economically because every horse saved means another weapon for the fight," and "the work is done by men who are not only horse doctors but horse lovers," and he also expresses "immense admiration for the organization of the corps and the ability, energy and humanity of its members."

An interesting sidelight of the trying conditions is shown when he says, "During the whole of last winter it was one continuous fight against rain with its consequent mud and attendant ills" for at one time the region of the veterinary hospitals was a "sea of mud."

The sick, wounded and debilitated horses are brought back to the hospitals from the "railhead" in batches of about two hundred and fifty, being sent back in cars that carry ammunition and supplies to the lines.

"The death rate (among the horses) was exceedingly small and constantly decreasing. Even when face to face with the stupendous difficulties of the early part of the campaign the work done by the Army Veterinary Corps was amazing."

"There was a spirit of cheerful compliance that made one feel that, so far as horses went, all was well in hand." This is high praise for one qualified to judge. The *London Daily Mail* also says, "The Veterinary Corps have saved their thousands by medical skill and organization." And the Earl of Lonsdale, well-known sportsman and horse lover, also says in the *London Daily Telegraph*, in writing of "the remarkable and to me extraordinary Army Veterinary Corps organization:" "I do not believe in all the various departments of the army that there is any that show more astonishing foresight in the preparation, alleviation and general superintendence of the animal than do the Army Veterinary Corps and Remount Department."

All through the article great stress is laid upon the importance of a thorough organization. The day of isolated individual effort, no matter how well intended, is passed, at least in modern military plants. *An organization must be prepared at least in skeletal form to successfully deal with the problems of modern warfare.* The same author goes on to point out that the present British Army Veterinary Organization is only twelve years old, being forced upon the army by the sad experiences of the war in South Africa when the Boers would gather up the abandoned British horses and by careful nursing and treatment would soon use them against the British. The British War Department was at that time "economizing" as we have been doing in the United States. The Indian army, however, being independent had organized an efficient veterinary service and was able at the outbreak of the South African war "to supply veterinary stores and three fully equipped veterinary hospitals, each of which was capable of sub-division into two complete self-contained establishments."

After the establishment of an organized veterinary hospital service sixty per cent of the horses were returned to service. This number of trained army horses is much more valuable than the same number of fresh green animals.

The need of a thorough veterinary organization in the British army had been presented to the army authorities in 1887 by Major D. B. Brown, who says in a war office publication: "Depots for sick animals must be formed on the line of communication at frequent intervals, each being in charge of a veterinary surgeon with a suitable number of farriers and attendants under him. These depots must keep pace with the formation and expansion of the transport and should not be an afterthought called into existence only when the number of sick animals has increased to a large figure.

These should be of two kinds, large and small, the latter are pushed up close to the army and take charge of all fresh cases. Animals whose recovery depends upon time, and cases of debility requiring nourishment such as small depots are unable to furnish, are passed to larger depots in the rear. In the Abyssinian campaign these depots were formed at intervals of seventy-five miles."

In closing the interesting article, Mr. Fairholme says:

"When without any undue and insular partiality we contrast our own splendid veterinary service with the corresponding organization of other armies and learn that at every point the British system has established a marked superiority, we may well congratulate our army veterinary authorities on their thoroughness and foresight."

Now that the American people are waking up to the military unpreparedness of the United States, we must do our duty and exert every effort to have our United States Army Veterinary Service organized so that when a crisis does occur the indispensable animal transport will be humanely, economically and efficiently provided for. The present system, if one can so dignify the condition of isolated independent veterinarians attached to various units, is totally inadequate and doomed to disaster as the British demonstrated in South Africa. It is just as necessary to have a system and organizations for the successful care and handling of sick and wounded animals as it is for the sick and injured troops. It is our duty as citizens and as veterinarians to see that this is provided for in the new plans for efficient national defense.

HEXAMETHYLENAMIN, ITS ACTION AND USE AS APPLIED TO VETERINARY PRACTICE

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Hexamethylenamin is sold under various trade names; as for instance, urotropin, urotone, formin, aminoform, hexamin, cystamin, cystogen, etc. It is produced by the action of ammonia on formaldehyde and occurs as colorless crystals which are without odor. In watery solutions it gives a slightly alkaline reaction. It is very soluble in water, less than two parts, and quite soluble in alcohol, about ten parts. Hexamethylenamin occurred as a chemical long before it was used by Prof. Nicolaier of Berlin in 1894 and 1895, when he was chief of the medical clinic of the University of Göttingen. It was first used as an antiseptic in kidney and bladder infections, later to destroy typhoid bacteria in the urine, and still later it was found to be of value in phosphaturia. It was first thought that it would act as a solvent of uric acid calculi, but this was soon disproved. This drug has no local action, and therefore is not used externally. When taken into the stomach it is absorbed rapidly and its elimination through the kidneys begins rapidly. It has no effect on the circulatory and nervous systems, and does not seem to cause general poisoning. It has not been shown that it has very strong action as an intestinal antiseptic, except that some of it may be excreted after absorption into the colon. Just what becomes of the whole of the hexamethylenamin in the body has not been determined, it is known to be largely excreted in the urine, and has been found in the blood, in the gall bladder, in the pancreatic juice, in the serous fluids of the cerebrospinal axis, and in the different serous membranes, and synovial fluids of the joints. The excretion into the urine begins quickly but if several doses are given, it may not be fully excreted for several days. The drug may be found in the urine in less than thirty minutes after giving, and it is stated that its presence in the cerebrospinal and synovial fluids can be determined in less than one hour. The drug is not cumulative and can be given over a long period of time without harmful effects. When administered hypodermically the drug has a tendency to cause necrosis at the point of injection. It is not considered advisable to administer it in this manner. The drug is non-toxic in ordinary dosage, and unless a vary large dose were

given toxic symptoms would not occur. The symptoms from an excessive dose in the human subject are gastric irritation, diarrhoea, abdominal pain, kidney congestion, and most likely an excessive irritation of the bladder with some hematuria.

THERAPEUTIC INDICATIONS. Hexamethylenamin has a wide range of therapeutic indications. Its value as an urinary antiseptic is unquestioned. It has been held that the drug should be administered with an acid when given to equines. In practice this has not been found necessary. It is one among a very few drugs which appears to have any laxative effect in forage poisoning of horses. Given in two to three drachm doses in connection with *F. E. Passiflora incarnata* one or two ounces it will prove of value in a large percentage of cases. We administer the above dosage to an average sized horse every three to four hours. It will undoubtedly prevent the above malady when given in one or two drachm doses twice daily. In pyemic arthritis of foals the drug has proven of worth, in fact it has given far better results than any other treatment we have employed. In open joints, it will prove good treatment, and in mammitis of cows it is an extremely useful drug. Influenza bronchitis, nasal catarrh, and distemper have all been benefitted by its use. Dr. Steffen states in "Special Veterinary Therapy," (a most valuable little volume), that he has found the drug quite useful in allaying inflammation in protracted or prolonged colics. He combines the hexamethylenamin with belladonna, capsicum, and passiflora. Hexamethylenamin is a drug that should receive more careful study as to its actions and indications in veterinary practice.

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THE ACTION OF A COAL TAR DISINFECTANT ON HOG CHOLERA VIRUS

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A few months ago a series of experiments were instituted for the purpose of determining the germicidal activity of Kreso on the virus of hog cholera. In collecting data of this nature, several important conditions must be fulfilled, particularly those involving proper control on the experiments. The virus used in the tests must be sufficiently virulent to cause the death of pigs within approximately fifteen days from the date of inoculation, and typical

symptoms and lesions of hog cholera must be present in control animals. Another important factor is the elimination of naturally immune hogs from the series of experiments.

The details of this series of experiments consisted in the careful selection of highly virulent virus (serum from hogs infected with hog cholera of acute type) and the addition of a coal tar disinfectant, Kreso, in various dilutions to this virus. The Kreso solution was allowed to remain in contact (in vitro) with the virus for exactly 5 minutes after which the mixture was injected intramuscularly into healthy pigs. Control pigs received the same dosage of the virus and were cared for under exactly the same conditions as the test animals. The following table compiled from our laboratory data illustrates the nature of these experiments:

No. Hog	Character of Test	Material Inoculated	Incubation Period	Type of Disease	Date of Death. Duration of Disease from time of exposure.	Character of Lesions
76	Control	2 Cc. Virus (73) 3-5-15	6 Days	Chronic	Recovered in 5 wks.	
141	Control	2 Cc. Virus (161) 8-28-15	3 Days	Acute	9-16-15 19 days	Typical
154	Control	Cc. Virus (161) 8-28-15	3 Days	Acute	9-11-15 14 days	Typical
163	1% Kreso Solution	2 Cc. Virus (155) Exposed 5 min. 1% Kreso 8-26-15	6 Days	Sub-acute	9-17-15 22 days	Typical
75	1% Kreso Solution	2 Cc. Virus (73) Exposed 5 min. 1% Kreso 3-5-15	10 Days	Acute	3-23-15 17 days	Typical
164	1% Kreso Solution	2 Cc. Virus (155) Exposed 5 min. 1% Kreso 8-26-15	5 Days	Sub-acute	9-17-15 22 days	Typical
165	2% Kreso Solution	2 Cc. Virus (161)* Exposed 5 min. 2% Kreso 9-1-15	No Symptoms—Released after 20 days			
166	2% Kreso Solution	2 Cc. Virus (161)* Exposed 5 min. 2% Kreso 9-1-15	No Symptoms—Released after 20 days			

* See data above under Hogs No. 141 and 154 which were inoculated with same material as No. 165 and No. 166, except virus was not exposed to action of 2% Kreso Solution. Hogs No. 141 and 154 served as controls on No. 165 and 166.

The results of these experiments show that highly virulent hog cholera virus (in the form of serum from cholera infected hogs), exposed for five minutes to the action of a two per cent solution of Kreso, is rendered inert.

CELLULAR EXTRACTS AND THEIR IMPORTANCE AS THERAPEUTIC AGENTS

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Extracts of tissue are known under the various synonyms of cellular extracts, tissue extracts and physiological extracts.

The development of this class of therapeutic agents during the past several years and the results obtained from their use in various conditions commonly encountered in veterinary practice gives to them an exalted position; one equal if not superior to the position occupied by biological products, including vaccines, serums and bacterins.

Many conditions that a few years ago were considered incurable or fatal, now respond favorably to one or the other of the cellular extracts, either administered alone or as an adjuvant to the regular old line treatment or in conjunction with one of the biological agents. The importance of this class of therapeutic agents is now too well established to be overlooked or ignored.

In the list of cellular extracts may be included pituitary extract, corpus luteum extract, adrenalin, thymus extract, thyroid extract, leucocytic extract, lymph gland extract, and perhaps a few others. The action of each is specific, although the veterinary profession is confronted with such a mass of literature along these lines, that a deal of reading and careful judgment is required to understand and select the cellular extract required for each condition.

It is with particular regard to the two latter extracts that this paper is written, namely leucocytic extract (Archibald) and lymph gland extract (Archibald). These extracts regulate and stimulate some of the body's most important physiologic functions; those which constitute the protective and defensive measures against disease and which are most active in inducing convalescence by their action in stimulating the leucocyte producing organs to a more active function.

It may be stated as a general principle, the correctness of which is recognized by the entire scientific world, that any therapeutic agent that will stimulate and increase the number of leucocytes constitutes rational treatment in all infections and toxemias and that this is a condition to be very much desired, as it is along the

lines of nature's own methods of controlling or eradicating disease. It is certainly a well established fact that in the treatment of these diseases any method which will stimulate the leucocyte producing organs to a more active function, thereby producing an increase in the number of leucocytes, is, and must of necessity be, of positive value.

The great problem which heretofore has confronted the veterinary profession is to determine how to produce this physiological effect by the simplest and most innocent means possible. Many vegetable protein substances have been used to bring about these physiological changes, but it is believed that in carrying out leucocyto-therapy, that in order to produce an increase in the number of leucocytes and at the same time increase their functional activities without unnecessary strain upon the individual, it is eminently more logical for the organism to care for parenteral injections of substances similar to its own elements than to any elements which are of a foreign character.

It has been proved beyond a question of doubt that when leucocytic extract is introduced parenterally into the bodies of experimental animals for experimental purposes and into human beings and domestic animals for the treatment of disease, the physiological results produced are a marked increase in the number of white blood corpuscles, especially those of the polymorphonuclear variety. The value of this is demonstrated by the fact that in the actual therapeutic application of leucocytic extract to individuals suffering from disease, the regulation of the leucocyte count is coincident with the improvement of the diseases so treated.

The polymorphonuclear leucocyte is the cell which migrates in greatest numbers into tissues, the site of an acute inflammatory process or becomes more active during an attack of any disease which causes general systemic disturbances of a febrile nature. By virtue of its amoeboid motion it is enabled to pass readily through the walls of the capillaries into the diseased or injured tissues where it is actively phagocytic. In general systemic febrile conditions the activity of the polymorphonuclear leucocyte assists in the care and elimination of toxic end-products, thus inducing a rapid convalescence. The semi-solid exudate which fills the intercellular spaces of involved areas in a localized acute inflammatory process is liquefied by means of an enzyme which is the product of this type of leucocyte and the digested elements are carried off through the lym-

phatics. The accumulation of polymorphonuclear leucocytes about the affected area acts to some extent as a wall or zone limiting the infection and preventing further invasion of the tissues.

Therefore it can be readily understood that the action resulting from the administration of leucocytic extract makes this cellular extract of great value in the treatment of many of the acute conditions encountered in veterinary practice. It is indicated in the treatment of all infections and toxemias including purpura, laminitis, pneumonia, pleurisy, influenza, azoturia, strangles, coryza, laryngitis, lymphangitis, edema, septicemia and the toxic bowel conditions following enteric disorders.

Lymph gland extract (Archibald) has been proven to be of great value in the treatment of chronic infections and those diseases which usually run a long course, for while it also produces an increase in the number of leucocytes, the greatest increase is in the number of lymphocytes or mononuclear cells.

The lymphocyte or mononuclear cell is more active in the control of chronic infections and toxemias than is the polymorphonuclear cell. It produces an enzyme of more marked activity consequently producing a more rapid and complete digestion of the partially organized exudates. It is not easily destroyed by toxins and is therefore a more successful barrier to extensive invasion of the tissues.

From the above we must conclude that the polymorphonuclear cells are more active in acute infections while the mononuclear cells are more effective in the control of chronic infections.

It is interesting to note that not only are we able to produce a leucocytosis at will, but are also enabled to stimulate that type of leucocytes whose activity will be of greatest benefit in the condition to be treated.

Lymph gland extract is indicated in the treatment of unresolved pneumonias, chronic bronchitis, chronic laminitis, febrile conditions of long standing, and has proven itself to be the best known treatment for canine distemper and mammitis in cows.

Cellular extracts are today attracting widespread attention in the ranks of the veterinary profession, particularly the leucocytic and lymph gland extracts; the good results being obtained from their use in some cases being almost unbelievable.

REPORTS OF CASES

THE GELATIN TREATMENT OF PETECHIAL FEVER

R. R. DYKSTRA, Manhattan, Kans.

German veterinary literature records the successful treatment of several cases of petechial fever of horses by subcutaneous injections of fluidified gelatin. A mare weighing about 1100 lbs., and affected with petechial fever was presented for treatment at the veterinary clinic of the Kansas State Agricultural College.

HISTORY:—About six weeks previous to being brought to the college hospital the animal received a deep wire-cut in the fold of the fetlock of the right fore limb. The wire-cut was healing slowly, and this long convalescent period had weakened the patient.

SYMPTOMS:—Temperature slightly elevated, pulse weak, respirations accelerated and laborious. Extensive edematous swellings of the limbs, lower surface of the thorax and abdomen, and of the head. The nasal mucosa showed several large, and the vaginal mucosa small, hemorrhagic spots and streaks; the appetite was good though the swellings of the masseteric region interfered with perfect mastication. A small bed-sore was beginning to develop on the right hip. The wire-cut appeared to be in a healthy granulating condition.

TREATMENT:—The animal was placed in slings. Fluidified gelatin was prepared according to a modified formula of Dr. Johann Schmidt, Dresden, as follows:

1. Boil 1000 cc. of tap water in a flask and permit it to cool to 50 degrees C.
2. Add 10 grams of sodium chloride.
3. Add 10 grams peptone, previously triturated with a little cold water.
4. Add 100 grams of pure gelatin, obtaining solution by constant agitation.
5. Add the whites of two chicken eggs, previously mixed with a little water.
6. The entire mixture is then placed in a water bath for thirty minutes, forming a clear liquid interspersed with flakes and coagula.
7. Add 100 cc. of a 2% aqueous phenol solution.

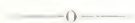
8. A very small quantity of sodium hydroxide solution is added to make the mixture slightly alkaline.

9. Filter through sterile filter paper.

10. Previous to injection liquefy the gelatin by placing it, in its container, in warm water.

Six hundred cubic centimeters of this fluid gelatin was injected subcutaneously, in six different places, with careful regard for asepsis. Moderate localized swellings and one abscess developed as a result of the injection. The former had disappeared in four days. At this time the hemorrhagic spots and streaks in the mucous membranes had disappeared, and the edematous swellings were disappearing. In order to hasten the latter a second subcutaneous injection of 400 cc. of fluidified gelatin was given eight days after the first. This was followed by complete recovery in a few days.

CONCLUSION:—No definite opinion, based on a single case, can be formed regarding the value of this treatment, though its action was apparently beneficial in this instance.



INTESTINAL INTUSSUSCEPTION IN CATTLE

Supplement to article in the March Number, 1915, of the
American Veterinary Review.

JOHN K. BOSSHART, Camden, N. Y.

CASE No. V:—Invagination of Ileum due to Intestinal tumor.

This patient was a black and white grade cow, aged 12. She had been in perfect health until May 12, 1915, when it was noticed that she gave no milk. Upon keeping her in the barn it was also found that she had no appetite for food and drink and that no manure was passed. Salts were given her by the owner with no results.

On May 14 the cow was examined by the writer and pulse, respiration and temperature were found to be normal. Peristalsis was somewhat suppressed, rumination feeble. A rectal examination revealed the absence of feces, but the presence of a mucilaginous exudate streaked with blood. Uterus and ovaries were found normal, but there was a firm mass palpated just within reach. Owing, however, to the forward position this mass could not be more closely palpated. A provisional diagnosis of intestinal obstruction, probably due to invagination was given and operation advised.

On May 15 the cow was operated upon, Dr. R. C. Hartman of Pulaski assisting the writer.

One ounce of chloral hydrate was administered in one quart of cold water. A five inch incision was made after thoroughly preparing the field in the right flank. The animal was permitted to remain in the standing position. After opening the abdominal cavity the right arm was introduced to search for the obstructed bowel. This was easily found and delivered through the wound. It was clearly a case of invagination and it proved to be unreduceable. Excision was indicated and properly done. End-to-end anastomosis by means of Lembert's sutures of catgut was obtained, the serosa sutured over it and fastened to the mesentery. Peritoneum and muscles were united separately with interrupted catgut sutures. Skin closed with silk.

Examining the removed part it was found to consist of over three feet of necrosed and devitalized intestine, the invagination being due to a tumor the size of a walnut.

The after care of this patient should have consisted in washing the wound with a hot saline solution twice daily and in giving small amounts of succulent food and water three times daily. The owner, however, permitted the cow to eat all she wanted the next day, which favor she certainly abused. The next day after that she was not able to rise to her feet and had lost her appetite entirely. After several days the owner was advised to draw her out into the lot and let her shift for herself, which she did. Ten days after this she was able to rise again to her feet, when assisted. Recovery was gradual from then on and complete. Her milk flow increased to 6 quarts night and morning until the middle of October when the owner sold her to a dealer.

CASE NO. VI. Another case of Invagination of the Ileum:

A four years old black and white grade cow was taken sick very similar to the previous one on Aug. 14, 1915.

Pulse, respiration and temperature were again normal. The hide however felt cold. A rectal examination again showed the mucilaginous exudate streaked with blood. The bladder was greatly distended and promptly catheterized. Uterus and ovaries normal. A firm floating mass was felt forward and downward, but it was not possible to grasp it or examine it by palpation.

Operation was advised and performed the next day, Aug. 16.

One ounce of chloral hydrate in one quart of cold water was

given at once and half that dose after the field of operation was prepared. The animal was in the stanchion, in the standing position when an incision into the abdominal cavity was made and a firm coil of intestine delivered through it which is shown in plate no. 4. The operation was completed as in case V. Recovery was uneventful.

The previous cases reported have been operated upon in the recumbent position and the experiment of carrying out this prolonged operation in the standing position is very gratifying. The intra-abdominal pressure is greatly lessened and consequently the



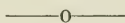
PLATE IV:—Operation for Intestinal Intussusception. Invaginated coil intestine prior to resection.

(Plates No. I, II, III have been published in the previous article.)

surgeon is less disturbed by protruding intestines. Foreign bodies, like exudates, blood or solutions, cannot enter the abdominal cavity so easily, especially when the incision is packed with dry gauze or linen.

Secondary attention should consist in providing a well lighted roomy place for the patient. Small amounts of grass, other succulent food or gruels and water should be given three times daily.

One pint of raw linseed oil or one pound of melted lard with stimulants should be given every second day until two weeks after the operation and then again as soon as the feces become firm or hard. An increase of grain, roughage and water should be allowed only gradually. The wound should be washed twice daily with hot salt-water. If primary union does not follow a stimulating antiseptic liniment should be applied.



LACTATION IN A FOAL.

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W. J. CLEVELAND, Havre, Mont.
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A Percheron mare, weight about 1400 lbs., age 9 yrs., owned by Mr. W. Judding near Buffalo Center, Iowa, foaled a mare colt in July 1910. This foal was perfectly normal in every respect. The dam at this time and for some time previous to parturition had been worked, and while not working was kept on pasture. When the foal was two or three days of age, the owner noticed that the colt's udder was enlarged. Upon further investigation it was found to contain milk. He milked out about a pint of milk at that time and he found that it was necessary to milk out the udder every day, at each milking he would get about a pint of milk. This continued for ten days, then the owner came to town to get something to stop the secretion if possible. He was given a solution of atropine sulphate and belladonna which he gave the foal morning and evening. When he began this treatment the secretion became less abundant until the tenth day when it had ceased entirely, and the foal continued to grow and developed into a fine colt.

ABSTRACTS FROM RECENT LITERATURE

INTERDIGITAL ABSCESSSES IN A SPANIEL TREATED BY VACCINE

H. TAYLOR, F.R.C.V.S.
Veterinary Record

For two years this dog suffered with very painful and now and then very large abscesses in the interdigital region. Many were the various treatments resorted to, but the trouble always recurred. It was then decided to try the effect of vaccine. Cultivations made from the coverings of swabs from the wound, had given cultures of *Staphylococcus albus* and a diphtheroid bacillus. An autogenous vaccine was prepared in vials of 1 cc. size and containing 300 million organisms in all, 200 million of the former and 100 million from the latter. Six vials were injected into the skin of the inside of the thigh, after painting the site of the injections with tincture of iodine. No constitutional disturbances or any local swelling following. The injections were made several days apart. But apparently the vaccine had no effect as the recurring abscesses reappeared with the same regularity as before. It must be noticed that since the injection, the dog had three of his paws affected at one time, whereas before he never had more than two. The size of the abscesses remained the same.

LIAUTARD.

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THE PREPARATION OF HOG CHOLERA SERUM

HERMAN UBBENS—Veterinary Inspector—Amsterdam.
Serum Institut of Rotterdam. Director Prof. Dr. J. Peels.

Centralbl. Bakt. Parasit. und Infekt—Orig. Heft No. 3—Bd. 72, 1914.

CONCLUSIONS

1. Hog cholera serum has a protective value against the disease.
2. The serum injection followed by the injection of the infectious material resulted in an active immunity.
3. If exposed animals are not immunized as a result of the exposure they must be injected with serum in the event of cholera developing later.

4. The serum has not only prophylactic value, but fairly strong curative action in the early stages of the disease.

5. The serum from a bovine injected with hog cholera virus possesses no protective value against the disease.

6. The method of preparing serum (clear) through clotting and pressing is preferable to the method of defibrinating and centrifugalizing.

7. It is preferable to tuberculinize hogs used in the preparations of hog cholera serum and exclude those which react.

8. The serum recovered with the method of clotting and pressing the blood resulted in the recovery of approximately $\frac{1}{2}$ of the bleeding and not infrequently more.

Virulent blood for hog cholera serum is collected in glass cylinders, 6 cm. in diameter and 50 cm. long, and the bleeding is allowed to stand at room temperature for several hours. The bleeding is then placed in a refrigerator for 48 hours and then pressure, by means of a weight, is exerted on the clot for 24 hours. The clear serum is siphoned into the containers.

Of the six bleedings (table No. 1) the proportion of serum to blood recovered averages 25 to 50, i.e., serum to 100 volumes of blood. Of 10 pigs bled (table No. 3) the proportion varied from 20 to 100 and 59 to 100.

Cultures made from the liver, spleen, kidneys and serum of the 10 pigs revealed the presence of the hog cholera bacillus in the liver and spleen of 9 of the 10 and in the kidneys of 8 of the 10 and in the serum of only 1 of the 10. No hog cholera bacilli were found in any of these organisms or the serum of pig No. 3.

In another series of 22 virus pigs the hog cholera bacillus was demonstrated in the liver and spleen of 19 and in the kidneys of 16 and not in the serum of any.

HYPERIMMUNIZATION:—Immune hogs were first injected subcutaneously with 500 c. c. doses of virus, the dose has now been cut down to 200 c. c. as follows.

August	1.....	1 c. c.	Virus....	10 c. c.	Serum
	14.....	10 c. c.	"		
	28.....	100 c. c.	"		
Sept.	12.....	200 c. c.	"		
	26.....	200 c. c.	"		
Oct.	10.....	200 c. c.	"		
	20.....	bled 1000	c. c.		
	24.....	200 c. c.	Virus		

Nov. 4.....bled 1000 c. c.
 8.....bled 1000 c. c.

Aside from the example above and the statement that hyper-immunes are bled every 4 days no definite schedule of hyperimmunization and bleeding are given.

Reference is made to the fact that "many hogs are tuberculous". A number were tuberculin tested "intercutaneous" with 100 milligrams of undiluted tuberculin injected at the base of the ear. Table No. 5 includes the results of the tuberculin test of 12 hogs of which 9 are positive and 3 negative. The table also shows that hog cholera bacilli cannot be demonstrated culturally in the liver, spleen and kidneys of hyperimmunes.

Table No. 6 includes the results of the tuberculin test of 28 hogs in comparison with the autopsy findings for tuberculosis. Eleven of the 28 reacted and lesions of tuberculosis were demonstrated in all of the 11. In addition to these, however, lesions of tuberculosis were found in 8 additional hogs. In other words, in accordance with the autopsy findings 18 of the hogs proved tuberculous, while only 11 of the 18 reacted to the intercutaneous tuberculin test.

HYPERIMMUNIZATION OF AN OX:—The repeated subcutaneous injection of virus in increasing the dose, beginning with 250 c. c. October 2nd and ending November 11th with the injection of 520 c. c. failed to produce a serum with any protective value whatsoever.

PRESERVATION OF SERUM:—To every 100 grams of serum, 10 grams of a chinisol solution (Chinosollösung) 1 to 10 were added.

REICHEL.

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A CASE OF LEAD POISONING IN THE PIG

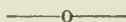
H. TAYLOR, F.R.C.V.S., Veterinary Record.

HISTORY:—A carpenter left a tin can containing about 2 lbs. of white lead paint in a cartshed on the ground. A sow three month pregnant ate it all. She was a large black animal and had covered herself more or less with some of the paint, which gave her a peculiar appearance. The next morning the whole thing was discovered, but nothing bad was expected of the event.

THE EFFECTS:—Two or three days after the animal was off her feed, her feces greyish white in color. She had a dose of Epsom's salts. In the next few days, she became dull, lethargic and ate but little. Eleven days after her lead festival, it was discovered that she had ingested about 2 pounds of the paint. With sulphates and iodide of potassium treatment she seemed to improve, although she showed some interference with her muscular action. On the 16th day, she was taken with brain manifestations, and ran about in an excited manner. Put in a pen, she raced about madly and blindly, banging her snout against the wall. One injection of morphia gave her little relief. She died about an hour after.

POINTS TO OBSERVE:—Length of time which elapsed between the ingestion of the paint and death. No abortion took place. Apparent recovery was followed by sudden brain manifestations—feces about normal in color at the latter end of the case—violence of the brain symptoms compared to the slight muscular ones. No blue line around the gums was detected.

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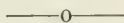


A BACTERIOLOGICAL STUDY OF TUBERCULOSIS OF THE LYMPH GLANDS IN CHILDREN

A. P. Mitchell, M. D., in the *Edinburg Med. Jour.*, Sept., 1914, No. 3, S. 209 Ref. Zbl. f. d. ges. Tuberkuloseforsch IX—4, sets forth the results of his findings in twenty-nine cases of tuberculosis in children under 12 years of age. Special attention was directed to the examination of the cervical, bronchial and mesenteric lymph glands, with an occasional examination of the tonsils. Upon testing twelve of the 29 cases for their cultural characteristics and virulence for rabbits it was found that eight proved to be of human and four of bovine type. Three of the children infected with the bovine type died of tubercular meningitis and one from intra-peritoneal haemorrhage, with all four cases revealing the primary seat of infection to be in the mesenteric glands. However, in two of the four cases the cervical as well as the bronchial glands were also infected. The eight cases which were infected with the human type of bacilli seven were found to show the primary localization in the bronchial gland, in the one remaining case the original seat of infection was uncertain. Tubercular bacilli were found in all the glands in the cases cited. In the 80 cases of tuberculosis reported

by Dr. Mitchell in The British Med. Jour., Jan. 17, 1914 he states that the bovine bacilli were present in 71 instances (88 percent) and the human bacillus in 9 cases (12 per cent). These eighty cases were surgical and the organisms were isolated from the cervical glands. Without exception all the above cases were of children under 12 years of age. Eighty-four percent of the children under two years of age were fed with unsterilized milk since their birth. In regard to the bovine cases it seems more than a coincidence that in not a single case was there a history of pulmonary tuberculosis in other members of the family, but, continues the writer, children of the same family in some instances showed cervical tuberculosis. It was found upon investigation that in 406 samples collected from the City of Edinburg that 82 (20 percent) contained tubercle bacilli.

MANSFIELD.



HYDATID DISEASE IN A DOG

H. A. REID, F.R.C.V.S.
Veterinary Journal

This is the illustrated record of a case observed in an aged collie dog which had been suffering with obstinate constipation and was rebellious to enemas and large doses of castor oil. His abdomen was much distended by ascites. The respirations and pulse were slightly accelerated. There was no jaundice. Chronic liver disease was diagnosed and at the urgent request of the owner, a treatment of aloin and calomel was prescribed, the abdomen having been tapped and relieved of about two quarts of sero-sanguinous fluid. Some relief was at first manifested but extreme emaciation took place and death followed from exhaustion. At the autopsy, the liver was found weighing three pounds and nine ounces, the gall bladder being greatly distended. The liver was the seat of a very extensive infection of *Echinococcus polymorphous*. Two cysts were found also in the spleen. In the bowels, there were numerous specimens of *Taenia marginatae* and *Dipylidium caninum* with also a number of *Taenia echinococci*.

LIAUTARD.

CATARRHAL FEVER COMPLICATED WITH IRREGULAR STRANGLES
AND TERMINATING IN GLANDERS

WM. SCOTT, F.R.C.V.S.
Veterinary News

This is a lengthy and interesting record, in which the writer was consulted, for a cob which had catarrhal fever. Profuse bilateral nasal discharge, sore throat, œdema of the pharyngeal mucosa, soft moist cough, œdema of the head, lips, four legs, sternum and sheath. Nodular growths on each side of the cheeks, some hard and fibrous, others soft and pointing, some discharging pus. Sub-maxillary glands swollen. Tubular and parenchymatous pulmonary invasion had taken place.

DIAGNOSIS. Catarrhal fever, complicated with strangles, with phenomena simulating purpura. The bacteriological diagnosis revealed the presence of streptococci, diplococci, staphylococci, and a pseudo-micrococcus catarrhalis.

From these a stock vaccine was prepared and given at various intervals, the composition of the vaccine being increased as per indication. After two weeks of treatment the cob was turned out and convalescent.

Some ten days after, he had a severe postpharyngeal abscess. Then a sero-bloody purulent nasal discharge appeared.

The mallein test was then resorted to. The sub-cutaneous, the ophthalmic and the intra-dermo-palpebral method was applied. The three gave a positive reaction, But the thermic reaction was negative. The test was renewed and again the same result obtained. The cob was finally destroyed by military orders and revealed at the post mortem lesions of glanders in the nasal cavities and of lobar pneumonia in both lungs.

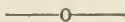
The writer remarks in conclusion—:“To obtain such positive results with three methods and a negative thermal sounds paradoxical, and may be explained in the fact that the use of vaccines prior to the mallein test may have so altered the body metabolism that a state of prophylaxis, or something akin to it, as against anaphylaxis had been established——.”

LIAUTARD.

A FATAL CASE OF TUBERCULOSIS OF A BOVINE ORIGIN

H. Bietzke (B. Kl. W. 1914, No. 33) describes a fatal case of tuberculosis in a 14 year old boy. Upon inoculation of both rabbits and cattle, Beitzke proved that the organism causing the boy's death to be of a bovine type. Thereby disproving the findings of Weilrauch, Heilstatte Edmundsthal in. Int. Zbl. f. d. ges. Tuberculoseforschung Klin. Beitrag IX, 4, that bovine tuberculosis was not harmful to man. Statistics collected by Weber show that over fifty per cent. of the deaths resulting from tuberculosis in children under two years of age are due to the infection with the bovine type.

MANSFIELD.



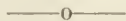
NUMERICAL ANOMALY OF THE INCISORS OF A HORSE

MR. M. PETIT
Bulletin de la Soc. Cent.

The upper jaw of this horse had ten incisors of the second dentition,—well-developed and irregularly arranged in two rows. The most external of the teeth overlapped over the anterior face of the incisor arch and seemed to have been pushed out by the internal. The length of the teeth was normal except one of the nippers which was greater. All the teeth were worn, but not regularly. The lower jaw had the normal number of incisors, shorter on the right side. They were triangular, the form that the teeth presented was that of a sixteen year old horse.

Similar cases of anomalies have already been recorded; they all take place on the upper jaw. Yet Lafosse and Goubaux have mentioned observations where both incisor arches were affected, and where the horses had twenty-four incisors.

LIAUTARD.



ATHEROMATOUS GREAT MESENTERIC ARTERY CAUSE OF DEATH

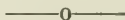
MAJOR DOCTOR PRUNEAU
Bulletin de la Soc. Cent.

A thirteen year old horse slipped on the pavement, with all his four feet, and fell heavily on the right side and had to be aided

to arise. He had an anxious expression of the face, shook all over and could not move. Slowly and with difficulty he was brought to his stable, where he died after a short period of agony.

POST MORTEM. Extensive ecchymotic spots on the right side of the body. No fracture. On opening the abdomen, blood and clots escaped in quantity. Around the kidneys and enveloping them there was an enormous clot. The liver and spleen were normal. The mesentery had a tear, eight or ten centimetres long and between its folds there was a clot as big as a child's head, from the center of which was exposed the gaping and still bleeding rupture of the great mesenteric. The intestines were normal. The aorta in its whole length showed atheromatous plates, with calcareous infiltration, more abundant in the abdominal than in the thoracic portion. The heart and valves were normal.

LIAUTARD.



THE MALLEIN OPHTHALMIC TEST IN GLANDERS

PROF. DR. JOSEF SCHNURER (Vienna)

Recorder for the X International Veterinary Congress

Monatshefte für Praktische Tierheilkunde XXVI Band 3./4. Heft.

CONCLUSIONS

1. It is possible to eradicate a glanders epizootic by killing clinically sick horses and by a diagnostic examination of horses found to be ailing. Immunization treatment is at least superfluous.

2. The most practical diagnostic method is one which, in comparatively short time (12-24 hours) gives reliable results even in the hands of people not possessing special training in this branch. A method which is simple to carry out and easy to form judgement on; and further, which lends itself to mass examination on the boundary and temporary investigation in the country itself and, at the same time, a method which is comparatively cheap.

3. The serological methods (agglutination, complement fixation, precipitation, conglutination, the Adberhalden and anaphylaxis reactions) do not either alone or in combination, fulfill these requirements, since they must invariably issue from a central station.

4. On the other hand all the above mentioned conditions are fulfilled by the mallein ophthalmic test operated by applying a

reliable concentrated mallein with a brush, pledget of cotton, glass rod or similar appliance but not by dropping in with a pipette or dropping bottle. Of 93,352 ophthalmic tests carried out in Austria (with the exception of Galicia and Bukowina) in the years 1910-1913, 341 glandered horses reacted 88.8% positive, 7.6% doubtful and 3.5% negative. Of 75,897 healthy horses, 99.6% showed a negative and 0.34% a positive reaction. The results which miscarried in the case of the glandered horses (3.5%) are to be attributed partly to the fact that the horses were only tested once several days before death, and partly from the probability of mistaken judgement and errors in the postmortem diagnosis (autopsy).

5. In order to clear doubtful cases, one can now and again provisionally draw on a serological reaction (agglutination or complement fixation). The conjunctival test does not interfere with the agglutination reaction.

6. Should even the serological reaction not lead to a rapid decision, the classical subcutaneous reaction with a standardized mallein is to be recommended. In drawing conclusions from this test, stress must be laid on the average temperature from 10 readings taken on the day after the inoculation. Under certain circumstances the temperature on the second day must also be taken into consideration. Of 46 glandered horses all showed a positive reaction and with 464 healthy horses 95.04% gave a negative result, this showing 4.96% of miscarried results in the case of the healthy horses.

7. The miscarried results of the mallein ophthalmic test and the subcutaneous reaction with healthy horses are accounted for by a hypersensitiveness towards mallein due to an existing glanders infection. This kind of animal can be correctly classified by consideration of the body temperature before and several days after the inoculation.

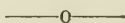
8. Going out from these fundamental principles it has been possible to eradicate indigenous glanders from Austria and to keep the whole country (with the exception of Galicia) free from glanders for months at a time in spite of severe incursions from heavily infected countries.

9. The imposition of a minimum period for traffic curtailment of suspected animals (quarantine period)—in Austria 60 days, in Germany 6 months—is for the present superfluous and inflicts an

unjustifiable hardship. The quarantine period should be made solely dependent on the results of the diagnostic examination.

10. It is not justifiable to kill horses which have only reacted positively in the mallein test or in the agglutination reaction and which otherwise exhibit no clinical disturbances, namely, no average temperature over 38°C . taken from a consecutive range of readings. Such horses are in all probability non-infected. The relationships in this case stand as in tuberculosis of cattle.

REICHEL.



A FEW CLINICAL OBSERVATIONS FROM THE SEAT OF WAR

Reported by MR. JACOULET
Bulletin de la Soc. Cent

1. PERIOSTITIS AND TRAUMATIC OSTEITIS by Mr. Noiseux.

Sorrel gelding, anglo-arab, nine years, had on the left hind cannon bone a gun shot wound, whose entrance was on the external face, a little above the fetlock joint, and the exit on the internal face a little higher than the other. Bloody suppuration escaped. A little above the place of exit, there was an abscess forming. The cannon bone was swollen, no weight was put on the leg which was held up and showed lancing pains. Diagnosis of fracture was left aside, but possibly the bone was partially split. Treatment, consisted of antiseptic care of wounds and frequent warm water lotions. After three days the abscess of the inner face of the cannon bone was punctured. Venous hemorrhage followed with formation of hematoma. Sloughing of the skin took place and improvement became manifest, the horse laid down himself and arose without help. On the tenth day, a swelling appeared on the anterior face of the cannon. An incision was made and two days after a piece of shrapnel, flattened on one face and convex on the other was extracted. Several others were removed at various times after a few days. The animal then walked fairly well and after a month's treatment resumed his work.

2. WOUND OF THE TESTICULAR REGION by Mr. Noiseux.

Arab stallion, six years old, received a ball on the posterior face

of the right thigh, which came out towards the middle of the internal face, close to the perineum. No important organ was injured. Lameness was slight, the fistulous tract healed rapidly. But there was on the scrotum a deep wound, which in some motions of the leg, while the animal walked, corresponded to the internal face of the thigh and it was supposed that perhaps the ball had penetrated through the scrotum and also the testicle. No exit opening was visible, the ball then was lodged in the organ. Soon the testicular organ swelled and became very painful. The animal rebelled against all hand examination. On the 6th day, an abscess formed, and was lanced, and an abundant escape of pus took place. The animal became more quiet, and the examination showed that the right testicle was drawn upward towards the entrance of the inguinal canal and the left was found twice as big as its normal size. The fistula of the abscess was probed and the foreign body detected. Two fistulous tracts developed and finally a very small piece of shrapnel embedded in the tail of the epididymis was extracted. Final cicatrization took place in a few days.

3. WOUND OF THE NECK by Mr. Lange.

Dappled grey gelding, eight years, had on the left side of the superior extremity of the neck, a wound whose superior border measured 20 centimetres. It began near the posterior portion of the parotid and terminated backward over the projecting parts of the muscles. The inferior border was convex downwards and ran parallel to the jugular groove. There was an abundant discharge of pus and the odor coming from the wound was very offensive. After disinfection, the four fingers could be introduced in the funnel shaped wound, whose bottom reached the median line of the neck, six centimetres below the atlas. Between the inferior border of the right parotid and the posterior border of the corresponding inferior maxillary, there was a big swelling from which escaped an abundant discharge, flowing towards the chin. Three fingers could be introduced, passing along the inner face of the maxillary bone and fragments of necrosed vertebral ligament were removed. No foreign body was detected. The laceration was the result of an obus bursting and yet all the important organs of the region escaped injury. A month's treatment and the gelding was well.

LIAUTARD.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

REPORT OF THE COMMITTEE ON DISEASES

(Continued from page 251)

15. The livestock sanitary authorities to be given power to provide in a practicable manner against the dangerous pollution of streams with hog cholera virus and provide for the safe disposal of garbage liable to be infected with hog cholera virus.

16. To prevent the spread of hog cholera by swine shown for exhibition purposes, such swine to be treated with serum and virus not less than twenty-one days prior to the opening date of the exhibit, or with serum alone not more than fifteen days before such time.

17. Provision for controlling for thirty days, by quarantine or otherwise, when deemed advisable by the proper authorities, of all swine treated with serum-virus, or premises on which such swine are kept, to prevent danger of possible spread of infection from inoculated animals.

If the above or similar regulations could be instituted and enforced there is no doubt that cholera in swine would be materially diminished and could with the judicious use of serum ultimately be eradicated from this or any other country. Since the advent of anti-hog cholera serum the enforcement of sanitary regulations has been neglected. In order to obtain and enforce efficient sanitary measures the pork producers must first be educated to the necessity of such measures.

The application of some of the simple sanitary rules has proved of very great monetary value to swine raisers. As an illustration the separation of the infected from the healthy swine by means of a clinical thermometer and the proper after care has been the means of saving over 50% of many infected herds.

If more consideration was given to proper hygienic care and sanitary control and less to the production, distribution and application of serum it is possible that hog cholera would soon become a much less serious disease economically than it is at the present time.

Two general methods are utilized in the immunization with anti-hog cholera serum, viz, the serum alone method and the simultaneous method.

The exact method of administering serum has been freely discussed at various associations and numerous articles have appeared in various publications. The operator must always provide clean and sterile instruments. It is true that the instruments become contaminated as soon as used but at least two needles should be provided in order that one may be placed in a disinfecting solution while the other is in use. The syringe should be sterilized by boiling, after being used for a few hours or after a herd has been immunized, before using it on another herd. The serum and virus should be injected deeply into the muscle in order to insure rapid absorption. Bad results frequently are the result of failure of absorption of the serum or virus that has been injected just beneath the skin in the subcutaneous fat. Swine that are in filthy muddy pens should not be injected because of the probability of infection in the needle wounds. Swine that are injected should be reasonably clean and the point of injection should be painted with tincture of iodine and the skin should be pinched after withdrawing the needle to prevent leakage.

The serum alone method produces an immunity for a period of from one week to three months but it does not entail any danger of infecting and producing cholera in a cholera free herd and establishing a new center of cholera in a community free of the disease. By the proper use of serum alone in communities where there are only a few centers, cholera could be efficiently controlled. In such cases the infected herd and all surrounding herds should be immunized and if necessary the process could be repeated six weeks later. This method of control is not as applicable when several counties of a state or the entire state is infected. Serum alone when given in large doses is of considerable value in the incubation period of the disease before the animals show visible symptoms, but after the temperature has risen. The judicious use of serum in such cases has saved as high as 80 or 90% of the exposed herd. The serum alone is recommended for immunizing pregnant sows but the simultaneous method should also be used to immunize swine that are to be introduced into healthy susceptible herds.

The dose of the serum alone treatment should not be less than 30cc. for each hundred pound live weight of hog.

The simultaneous method is used more extensively than the serum alone, because it produces a longer immunity. The dose of serum used in the simultaneous method should be 50% more than

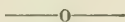
the dose in the serum alone method. The serum and virus must be introduced separately in different parts of the body.

This method may be used successfully in exposed herds especially in those swine that do not show a high temperature. But the virus should not be given to hogs that are showing visible signs of cholera.

The one serious disadvantage of the simultaneous method is the fact that infection is introduced. Good authorities claim that a hog immunized by the simultaneous method does not eliminate the virus unless he dies of the disease but this statement has not been clearly proven and even though the virus is eliminated only in case of fatal illness of the immunized hog the procedure is dangerous to say the least. The extensive epizootic of hog cholera in Iowa and adjoining states in 1913 bears the ear marks of the results of simultaneous immunization. To say the least the use of the simultaneous method is contrary to good sanitation.

A so-called double method has been advocated by some for the prevention of cholera. It consists of the serum alone immunization followed ten days later by the simultaneous method. The efficiency of this method is questionable and it is expensive.

In time the application of serum in the control of hog cholera will be rationally adjusted and this combined with the proper enforcement of efficient sanitary regulations will result in diminishing the losses from this disease and the swine industry will be profitably pursued.



THE PREPARATION AND USE OF HOG CHOLERA SERUM AND THE TREATMENT OF HOGS SICK WITH CHOLERA

S. H. GILLILAND, V.M.D., M.D.

The earliest record of the use of serum for the prevention of hog cholera was made in 1897 by Preisz, who obtained the serum from swine that had recovered from an attack of hog cholera. Shortly after the announcement in 1904 by de Schweinitz and Dorset that the true cause of hog cholera was a filterable virus, Dorset, McBride and Niles devised a method of immunizing swine against hog cholera. This method was termed "Hyper-immunization."

The United States Live Stock Sanitary Association at its annual

meeting in December, 1913, outlined some recommendations bearing upon hog cholera control and the production of hog cholera serum. Their recommendations for the production, distribution and administration of the serum is divided into four headings, as follows:—

“A. *Location of Buildings*: The location to be such that the surroundings will not interfere with sanitary production and that their operation will not contaminate surrounding areas.

“B. *Construction of Buildings*: The construction of buildings to be of material that will permit of daily cleaning and disinfection, stone, brick, tile and concrete being especially recommended.

“C. *Arrangement of Plant*: The arrangement of buildings to be such as to facilitate the production of a pure and uncontaminated product. The swine are to be kept in separate buildings, located a sufficient distance from the building containing the bleeding (either virus or serum) and hyperimmunizing room and in which swine are to be placed for the latter purpose only. The serum bleeding room and the hyper-immunizing room to be separate and distinct rooms. The preparation of serum and the preparation of virus from the whole blood to be operations conducted in separate and distinct rooms without direct communication with each other or with the foregoing not larger than an opening which will permit the transfer of receptacles containing the freshly-drawn blood and to be used for no other purpose. Separate washing and sterilizing rooms to be provided. The prepared serum and virus to be stored in properly cooled rooms. Swine kept for virus production and the testing of serum to be properly isolated so as to reduce to a minimum the danger of spreading infection. Separate and distinct feed rooms to be provided for such animals. Mortuary, crematory, abattoir and desiccating or rendering plant operated for utilizing the waste products of the establishment to be located so as to prevent contamination from this source. Necessary dressing and toilet rooms properly equipped and located to be provided. Also, bottling and packing rooms. Provisions for the sanitary disposal of manure, offal and debris.

“D. *The Operation of the Plant*: The operation of serum plants to be under the direct supervision of a competent veterinarian, who is a graduate of a recognized veterinary college as prescribed by the U. S. Department of Agriculture. Provision that all serum and virus be produced from healthy animals and be free from injurious organisms or substances. The label on the container to show that serum has been tested according to regulations prescribed by the U. S. Bureau of Animal Industry and comes up to the required standard of potency and purity. Similar regulations in regard to virus.

“E. *Distribution and Administration*: The virus in connection with serum or virus alone to be shipped, sold or supplied to

and administered by specially licensed persons only, and under direction and supervision of state authorities as far as practicable."

PREPARATION OF SERUM. The production of hog cholera serum cannot be classed as a difficult procedure. One of the most essential facts is a careful technique by trained laboratory workers in order to keep the serum free from extraneous organisms.

The selection of the hog to be immunized should be made with care. All animals selected for this purpose should be tuberculin-tested by the intradermal method to prove their freedom from tuberculosis. They should also be kept in quarantine under veterinary observation for a period of at least ten days, to prove that they have not previously been exposed to an infection such as foot-and-mouth disease. It has been reported that hogs of the bacon type are better adapted to the production of serum than those of the lard type. It is obvious that if the tail method of bleeding is to be used, that a hog with a long tail is desirable. Again, if the intravenous method of injecting the virus is to be followed, hogs with heavy ears and prominent veins are best suited for this purpose. The hogs should preferably weigh from 100 to 200 lbs. Hogs weighing more than 200 lbs. are difficult to handle. There are several methods by which immune hogs may be obtained. One is to secure hogs that have passed through an attack of cholera and have been left with an acquired immunity. These kind of hogs are hard to procure and greatly increases the cost of production. Another method is to purchase the number of hogs required and give them an injection of hog cholera serum and then expose them to hog cholera virus infection by placing them in infected pens and associated with hogs sick with cholera. The most reliable method and the one recommended by this committee is to procure a number of healthy hogs and after carefully testing them with tuberculin as above recommended and keeping them under observation for a period of ten days, they are given the simultaneous method of treatment, which consists in the injection of 1 to 2 cc. of virulent virus blood and from 20 to 40 cc. of serum. The dosage of the virulent virus blood and the serum depends upon the size of the animal to be immunized. After twenty-one days from this double treatment the animal is then ready for hyper-immunization.

PROCESS OF HYPER-IMMUNIZATION. The immune hog that has received the simultaneous treatment as above-described, after 21 days is ready to be hyper-immunized and may be treated by one of

the following methods. In practical work it has often been found advantageous to use one process and at times another.

I. *Subcutaneous Method.*

- (a) Inject the immune hog subcutaneously with virulent virus blood in the proportion of 8 to 10 cc. of blood for each pound of body weight.
- (b) Inject the immune hog subcutaneously with 1 cc. of virulent virus blood for each pound of body weight. Then after an interval of one week give a second injection of 25 cc. of virulent virus blood for each pound of body weight. After another interval of one week give a third injection of 5 cc. of virulent virus blood for each pound of body weight. The injections are made subcutaneously in the region of the groin and on the abdomen.

II. *Intravenous Method.*

- (a) Inject the immune animal intravenously with virulent virus blood in the proportion of 5 cc. of blood for each pound of body weight.
- (b) Inject the immune animal intravenously with virulent virus blood in the proportion of 5 cc. of blood for each pound of body weight, and then after an interval of one week, if the hog has fully recovered from the previous inoculation, repeat the injection.

III. *Intra-abdominal Method.*

Inject the immune hog intra-abdominally with virulent virus blood in the proportion of 10 cc. of blood for each pound of body weight.

The above directions for hyper-immunizing the immune hogs are not inflexible, and therefore satisfactory results may be secured by modifying the method of administration in regard to the number of doses given, as well as the dosage of the virulent virus blood, but it is generally believed that little will be gained by increasing or diminishing the amount of virulent virus blood from that stated. Experience has shown that larger amounts cannot be conveniently injected and that smaller amounts result in a serum of lower potency. Hog cholera serum produced by any of the above methods of hyper-immunization appears to be equally potent. The intravenous method of injecting the virus is recommended, though it is somewhat more difficult to give, especially in the hands of the beginner. The virus is injected into the large veins on the upper surface of the ear. This method has the advantage of requiring less virus blood than either the subcutaneous or intra-abdominal method. It is essential that the injections be made in an aseptic manner in all the methods.

The quick subcutaneous method (a) is not as safe as the slow subcutaneous method (b), for the hog is occasionally killed by the single large dose of virulent virus blood. It has been reported that hogs hyper-immunized by one large subcutaneous injection usually regain their health more slowly than hogs treated by the other methods.

The most potent serum produced by Dorset & McBride (1) appears to have been with a slow method of immunity. In one of their animals, No. 1383, 5 cc. of this serum protected 30 to 35 pound pigs from inoculation with 1 to 2 cc. of virulent virus.

As a rule the immune hogs are not greatly affected by the hyper-immunization injections providing the virulent virus blood is not contaminated and the injections made in an aseptic manner, the most notable symptoms being loss of appetite and listlessness for a few days. If too large a quantity of virus is injected at one place in the subcutaneous method, soreness and stiffness is liable to follow and in a number of instances abscess formation. In almost all cases the immune hog will have recovered from any ill-effects from the virulent virus injections in a few days, and after eight or ten days is ready for bleeding.

It is advisable that all hogs for hyper-immunization purposes be described and numbered by an ear tag. This description and number should be placed on a record card and this record card should follow the animal through the entire treatment and should contain information upon the date and dosage of treatment, the daily temperature measurements, the date and amount of blood recovered as well as a final autopsy of the animal.

PRODUCTION OF VIRULENT VIRUS BLOOD. The production of virulent virus blood is an important problem in the manufacture of hog cholera serum, as it is required in large quantities not only for the hyper-immunization of the hogs at the serum laboratories, but is required in conjunction with the serum in the application of the simultaneous method of preventing hog cholera. It is further important that the virus blood be of a standard potency. There are three methods by which virus blood may be obtained.

(a) *Slaughter House Virus Blood.*

This is the easiest method of securing virus, though it is the least desirable. Where it is done the usual plan is to take the hogs that show signs of cholera

(1) U. S. Bureau of Animal Industry Bulletin 102, pg. 39.

when received at the slaughter house, and when killed save the blood from them. In such cases the animals should be examined to ascertain whether they contain lesions of cholera. Virus blood obtained in this way is bound to vary in potency and it is often difficult to collect it in a manner that will insure it from containing a number of extraneous organisms.

(b) *Field Virus Blood.*

It has been observed that the virus of cholera is apparently more virulent at the commencement of an outbreak of hog cholera than later on. It has been suggested that if we take the first few animals that appear real sick when the disease first appears on a farm, and bleed them, we will obtain a virus that is usually of high virulence. This method of obtaining virus blood is followed largely in the state of Ohio and is considered better than the slaughter house method of obtaining virus.

(c) *Injection Method.*

This method appears the most reliable and is the one recommended to be used. It is first necessary to obtain a virus of the highest virulence and then reproduce it in young animals weighing from 60 to 100 lbs. It has been found that hogs of this age and weight are more susceptible than older animals. Virus obtained under this method is of known potency and it can also be drawn under more aseptic conditions. However, the greatest disadvantage to the method is the cost of the young shoats for the production of the virus. In producing virus after this method doses of from 2 to 5 cc. of virus is injected into the muscles of the inner side of the thigh. If the strain of virus used is virulent the animal should show evidence of cholera by the fifth day, and as soon as the symptoms are pronounced the animal should be bled. The blood from animals killed in a moribund condition or allowed to die is liable to contain contaminating organisms.

Each animal for the production of virus blood should be tuberculin-tested and kept under veterinary observation in non-infected pens for a period of ten days before the virus is injected. The animal should also have a record card showing the daily temperature measurements, weight, amount of virus given, amount of blood obtained and autopsy.

The method of removing the blood from the virus infected pig is to confine the pig on its back in a trough-like table with the pos-

terior end of the table elevated. The blood is taken from the larger vessels of the neck in an aseptic manner. The skin must first be thoroughly cleansed and rendered aseptic. The operator must wear a sterile coat and surgeon's rubber gloves. All instruments should be thoroughly sterilized. The virus blood should be immediately shaken as soon as drawn in order to prevent the formation of a clot. It is then filtered through several layers of sterile cotton or gauze. This virus blood is then kept in sterile bottles on ice until used. It is recommended that it be used as soon after drawn as possible. To the virus blood to be used for hyper-immunization purposes, no preservative need be added. It is, however, advisable to add one-half of one per cent carbolic acid as a preservative to the virus sent out for field work, in connection with the simultaneous treatment. Guinea pigs should be inoculated and cultures made from all lots of virus blood to prove its freedom from contamination. It is customary and is recommended that the virus blood for hyper-immunizing purposes should be used within 24 hours after it has been drawn. It should be free from extraneous organisms of any character.

After the virus pig has been bled to death a careful autopsy should be performed, and unless typical pathological lesions of hog cholera are found upon post-mortem examination, the virus blood should not be used.

There is another method of obtaining virus from infected pigs which consists in injecting a litre or more of normal saline solution into the peritoneal cavity and some hours later killing the animal and recovering the salt solution. This method has not met with general favor.

BLEEDING OF HYPER-IMMUNIZED HOGS. The hyper-immunized hog may be bled seven to ten days after the last dose of virulent virus blood. There are two general methods of bleeding, the tail method and the quick method from the vessels of the neck. The animal is confined according to the method to be used. The room, utensils and everything connected with this work should be specially prepared in order that the blood withdrawn may be free from contamination.

In the tail method, about one inch of the tail is clipped off with a sharp chisel after it has been thoroughly cleansed. The blood is allowed to flow into a sterile receptacle. Haslam, Hogan and Christian¹ have devised a vacuum method of drawing the blood

(1) *Journal of Infectious Diseases*, Vol. 16, No. 3, pg. 491.

from the tail which increases the yield of serum and decreases the labor. The amount of blood to be drawn by this method is about 5 cc. for each pound of body weight. After three bleedings from the tail at intervals of one week, the animal can again be given an injection of virulent virus blood. If the intravenous method is used, 5 cc. of virus blood to each pound of body weight is given. However, if the subcutaneous method of administering the virus blood is followed, then about double the dose should be given. At some plants as many as four tail bleedings are made before the animal is "re-hyperimmunized."

If the blood is drawn from the large vessels of the neck the animal is bled to death at once the same as obtaining the virus blood. The blood as soon as drawn is defibrinated by shaking or passing through a fruit juicer and then filtered through sterile cotton or cheese-cloth. The resulting filtrate is known as "Hog Cholera Serum", but is really defibrinated blood. To this defibrinated blood there is added a sufficient quantity of 5% carbolic acid solution so that the total volume contains $\frac{1}{2}$ of 1% carbolic acid. In some laboratories the defibrinated blood is centrifuged in order to remove the blood cells and thereby obtain a clear amber-colored serum. This is to be advised even though it does increase the cost of production.

DETERMINATION OF THE POTENCY OF THE SERUM. The potency of the anti-hog-cholera-serum is tested in the United States by administering serum to susceptible pigs and then inoculating them with virulent virus blood, at the same time giving two or more pigs virulent virus blood without serum. If the pigs receiving both serum and virulent blood survive and those receiving only the virus blood readily succumb, the serum is declared of sufficient potency to be sold. All hog cholera serum offered for interstate sale in the United States must be subjected to the rigid test required by the Bureau of Animal Industry, which is as follows:—Select eight pigs known to be susceptible to hog cholera and weighing from 30 to 60 lbs. each and divide them into four groups of two pigs each. The first group is to be injected with 2 cc. of virus blood, the potency of which is known, and 10 cc. of the serum to be tested on the opposite side of the body from which virus blood is injected. Group two is to receive the same quantity of virus blood and 15 cc. of serum. Group three to receive the same quantity of blood and 20 cc. of serum. The two animals in group four are to receive the virus blood

only. To consider the test satisfactory the pigs in group four that receive no serum should show symptoms of cholera within seven days and should die or be killed within fifteen days, at which time they are autopsied and must show typical acute hog cholera lesions. Temperature measurements of all the animals are to be taken and recorded daily.

If the two pigs which receive only the virulent blood die, and those which receive 10 cc. of the serum sicken but recover, while those which receive the larger doses of serum remain well, the serum is then considered of sufficient potency for use. It has been found that nearly all hogs properly hyper-immunized will yield a serum which is sufficiently potent to use in doses of 20 cc. to protect pigs weighing between 20 and 100 lbs. Carrying out this idea of always using a dose of 20 cc. for hogs weighing from 20 to 100 lbs., it is only necessary in standardizing to determine the action of a serum in a dose of 20 cc. If the test pigs do not sicken after a simultaneous injection of virulent virus blood and 20 cc. of the serum, the serum may then be considered suitable for practical use. Of course great care is necessary to avoid misleading results. Susceptible pigs must be used for the tests, and the virus blood must be of undoubted virulence as shown by its effects on the pigs which receive no serum.

It has been found that the defibrinated blood or serum may be kept for a year or over without greatly losing its potency. However, it is necessary that it be kept at a temperature of 35 to 40° F. All lots of serum should be tested bacteriologically as well as physiologically. Any lots of serum found to contain pathogenic organisms should be discarded. The ideal serum should be free from all extraneous organisms. A guinea pig should be able to stand an intraperitoneal injection of 1 cc. of the serum without any ill effects.

STANDARDIZATION OF HOG CHOLERA SERUM. Haslam and Franklin¹ have attempted to eliminate some of the sources of error in standardizing anti-hog-cholera serum by comparing the serum to be tested with a standard, centrifugated, dried anti-hog-cholera serum. The dose of serum which protects all of the pigs from visible symptoms of the disease and from continued temperatures above 104° F. is termed the P plus dose and the dose which just fails to protect is termed the P minus dose.

The serum was dried in a Faust drier at a temperature below

(1) *Journal Infectious Diseases*, Vol. 15, No. 2, Sept. 15, '14, pp. 257-267.

40° C. and subsequently dissolved in sterile water and restored to its original volume.

The defibrinated blood was distinctly less potent than the centrifugated serum and the washed corpuscles had very slight protective value.

It was also determined that storage of the serum in aluminum vessels for 24 hours did not measurably effect its potency.

Some of the factors that interfere with the accurate standardization of hog cholera are the varying strength of hog cholera virus, the various grades of susceptibility exhibited towards hog cholera by pigs of different breeds, ages, weights and sources, and the deterioration of the virus and serum by exposure to light, air, moisture, etc.

The use of a hog cholera virus of fixed virulence, with a control of dried serum and the use of a larger number of test pigs should serve to increase the accuracy of the standardization of anti-hog-cholera serum.

The careful standardizing is an essential fact in the successful use of hog cholera serum.

ADMINISTRATION AND USE OF HOG CHOLERA SERUM. There are two general methods of using hog cholera serum and both have their advocates. It is believed that one method may be adapted to a certain part of the country where another method would be dangerous. In those sections of the country where hog cholera is not prevalent, it is not considered advisable to use the simultaneous method on account of the danger of spreading the infection. The methods are as follows:—

(a) *Serum Alone Method.*

This method, as the name will imply, is the use of serum alone. The injections should be made on the inner sides of the thighs. Before giving the injection the temperature of the animal should be taken to determine whether or not there is any evidence of commencing cholera. Any animal having a temperature of over 104 should be recorded as suspicious. The average dose of serum used varies somewhat with the experience of the practitioner, but in a general way the average dose may be put down as follows:—

	cc.
10- to 25-pound pigs.....	10
25- to 50-pound shoats.....	15
50- to 75-pound shoats.....	20

75- to 100-pound shoats.....	25
100- to 125-pound hogs.....	30
125- to 150-pound hogs.....	35
150- to 200-pound hogs.....	40
200- to 250-pound hogs.....	50
All hogs weighing over 250 lbs...	60

In those cases where a high temperature is present, indicating the possibility of an on-coming attack of cholera, it is a wise measure to practically double the dose of serum. It is not claimed that the serum will cure animals sick of cholera, but a number of instances have been reported of encouraging results obtained from serum alone in animals in which the disease is just starting and do not show a temperature of more than 105. Where the animal is visibly very sick and the temperature is more than 107, it is of little value to give serum. The serum may be administered at any point of the body, either into the muscle or subcutaneously; but in small shoats, as aforesaid, the inner part of the thigh is selected, and in large hogs, where it is difficult to cast them, the serum may be administered back of the ear while the animal is held by a rope "snubbed" around the upper jaw.

(b) *Simultaneous Method of Treatment.*

In giving the simultaneous method of treatment to a herd, the work is done in just the same manner as for the serum alone method with the exception that a dose of the virus blood is also injected at the same time the serum is given. The virus and serum should not be mixed and injected together nor should they be injected at the same point. If the serum is injected into the muscles of the right hind leg, the virus should be given in the muscles of the left leg or at some other point of the body. The dose of virus varies the same as the serum, depending upon the weight and size of the animal. The following figures are the approximate doses in which the virus blood is recommended:—

10- to 25-pound pigs	$\frac{1}{4}$
25- to 50-pound pigs	$\frac{1}{2}$
50- to 75-pound shoats	$\frac{3}{4}$
75- to 100-pound shoats	$\frac{3}{4}$
100- to 125-pound shoats	1
125- to 150-pound shoats	1
150- to 200-pound hogs	$1\frac{1}{2}$
200- to 250-pound hogs	$1\frac{1}{2}$
All hogs over 250 pounds.....	$1\frac{1}{2}$ to 2

The dosage of the serum in the simultaneous method is the same as given under the serum alone method.

The injection of both the serum and virus should be done in a careful and cleanly manner and under strict aseptic conditions. In order to avoid bad after results the syringe used for the injections must be thoroughly sterilized and the needles should be kept in a solution of lysol between the injection of each animal. A number of needles will facilitate the work. The skin should be washed with a strong disinfectant solution and afterward painted with tincture of iodine at the point of insertion of the needle. If more than 40 cc. of serum are to be given it is advisable to inject it at two or more places. The animals following the treatment should be kept in a clean shady pasture lot or pens and away from mud-holes, barn-yards, etc. Animals should not be castrated or spayed until they have recovered from all effects of the treatment. It is advisable that very little food be given them for the first 24 to 48 hours following the treatment. All abscesses should be opened and drained. In the case of hogs developing abscesses from the injection of the virus blood, such animals should be isolated and the abscesses treated aseptically.

The disadvantages of the serum alone method is the fact that the immunity conferred by the serum does not last longer than from two to eight weeks. In exceptional cases it may last longer than this, but there are many instances on record where the immunity was lost in less than eight weeks. It therefore can be considered only a passive immunity and is applicable to herds in which the infection is not severe. In the use of the serum alone method of treatment, it is necessary to thoroughly disinfect the premises and dispose of all chances of later infection of the serum treated animals. The serious problem in the administration of the simultaneous method is the fact that these animals after being treated may become carriers of the infection of hog cholera the same as we have typhoid or diphtheria carriers in people. This belief is not held by all hog cholera workers, but there is still lacking sufficient evidence to disprove the assumption.

It is a known fact that where the simultaneous method of treatment has been advocated and generally used that there have been more outbreaks of hog cholera, though the death rate may not be so great as prior to the use of hog cholera serum. Again, in the simultaneous method the administration of the virulent virus blood should be done by one who is experienced in this work so that there may be no chance of the operator spreading infection over the

premises by the careless handling of this virus blood. It seems that it would be advisable to market the virus blood in a graduated syringe container ready for direct injection the same as diphtheria antitoxin and other biologic products are marketed to-day. This would avoid all exposure of the virus blood prior to or during the time of injection. The containers in which it is marketed should be destroyed by burning or thoroughly sterilized by boiling. We have left, however, the chance of the animal receiving the simultaneous treatment becoming a carrier and transmitter of the infection of hog cholera.

The simultaneous method may be used successfully in localities where hog cholera is extremely prevalent and the herds are at all times exposed to infection. The method naturally gives a much longer immunity. It is considered advisable by some men to double the dose of serum when the simultaneous method is used. This greatly increases the cost of the treatment.

From the experience of some men it seems unwise to give the simultaneous method to pigs under six weeks of age. They may be given the serum alone treatment and later the simultaneous treatment after weaning. Pigs from an immune mother apparently have a sufficient immunity until weaned.

It is strongly recommended to the veterinary profession generally that serum and virus be used from a manufacturer who is regularly licensed by the U. S. Department of Agriculture in accordance with an act approved March 4th, 1913 (See Appendix) to manufacture and sell hog cholera serum and virus. The labels on the packages will indicate whether the product has been prepared under such a license. This law cannot be too highly commended, and if rigidly enforced it will do much to bring about uniformity in these products as well as prevent worthless serum or virus being placed on the market. It must be remembered, however, that there are some state laboratories that are producing a very reliable product who do not require a license to operate within their own state.

At the eighteenth annual meeting of the U. S. Livestock Sanitary Association, Reichel of Pennsylvania gave a report upon the Refinement of Hog Cholera Serum in which he stated that the preparation of hog cholera serum globulin from hog cholera serum is an entirely practical procedure, and with proper facilities the increased labor will add but slightly to the cost of the production of the individual dose. He informs the writer in a private com-

munication that it has been proven to be a rather simple matter to recover all of the globulins from a given lot of hog cholera serum, and can bring the globulins into solution in one-fourth the original volume. He has found that he can concentrate uniformly hog cholera serum to one-third the original volume, so that 5 cc. of the concentrated serum will protect test pigs as satisfactorily as 15 cc. of the original material.

If it is found that the cost of concentration and the refinement of hog cholera serum is not prohibitive, it will certainly greatly improve the product, for it eliminates all inert material and thereby quicker absorption is obtained. The product is sterile when finished, which is another great advantage.

TREATMENT OF HOGS SICK WITH CHOLERA. In regard to the *medicinal* treatment of hogs sick with cholera, little can be said. A great many preparations have been advocated, all of which proved to have little or no curative value. The treatment indicated is to support the strength, improve the appetite and regulate the bowels.

Some years ago the late Dr. D. E. Salmon of the Bureau of Animal Industry devised a formula which has been found to be of value in stimulating the appetite and overcoming the digestive disorder. However, it is not to be considered a cure in any sense and in no way is to be compared to serum as a preventative. It is as follows:—

Wood Charcoal	1 pound
Sulphur	1 pound
Sodium Chloride	2 pounds
Sodium Bicarbonate	2 pounds
Sodium Hyposulphite	2 pounds
Sodium Sulphate	1 pound
Antimony Sulphide	1 pound

These ingredients are to be well mixed together and given in a dose of a tablespoonful once daily to each 200 lbs. of body weight. Any further *medicinal* treatment depends upon the symptoms of the animal.

In the case of animals that are not distinctly sick and have a temperature ranging between 104° F. and 106° F. may be given large doses of serum alone. If any benefit is to be derived from the serum it should be very potent and given in much larger dosage than for the preventative treatment. Animals markedly sick and with a high temperature do not respond to any form of treatment.

APPENDIX. An act of Congress approved March 4th, 1913 vests in the Secretary of Agriculture the power to prescribe regulations for the production of hog cholera serum and virus as well as other viruses, serums, toxins and analogous products. Some of the main features contained in these regulations pertaining to hog cholera plants are rules which require a complete separation of all virus and serum and entirely separate equipment for the preparation of these products. Adequate space should be provided for all procedures. A sufficient amount of natural or artificial light should be supplied for all parts of the establishment. The construction of the plant should be of such a nature that all rooms, pens, yards, etc., may be easily and thoroughly cleaned and disinfected. All rooms, pens, alley-ways, yards, etc., should be appropriately drained and gutted. Arrangements should be made so that hogs furnishing virus or serum may be entirely prepared for bleeding before they are taken into the rooms in which blood is collected, and the rooms in which blood is collected should be used for that purpose only. Immediately after the blood has been collected the animal furnishing it should be removed.

In order to meet all requirements it is necessary for establishments to be under the personal supervision of a competent man at all times while they are in operation.

An extract of the law and the regulations for its enforcement are herewith quoted:—

“An act making appropriations for the Department of Agriculture for the fiscal year ending June thirtieth, nineteen hundred and fourteen,” approved March 4, 1913.

“That from and after July first, nineteen hundred and thirteen, it shall be unlawful for any person, firm or corporation to prepare, sell, barter, or exchange in the District of Columbia, or in the Territories, or in any place under the jurisdiction of the United States, or to ship or deliver for shipment from one State or Territory or the District of Columbia, any worthless, contaminated, dangerous or harmful virus, serum, toxin, or analogous product intended for use in the treatment of domestic animals, and no person, firm or corporation shall prepare, sell, barter, exchange, or ship as aforesaid any virus, serum, toxin, or analogous product manufactured within the United States and intended for use in the treatment of domestic animals, unless and until the said virus, serum, toxin, or analogous product shall have been prepared, under and in compliance with regulations prescribed by the Secretary of Agriculture, at an Establishment holding an unsuspended and unrevoked

license issued by the Secretary of Agriculture as hereinafter authorized. That the importation into the United States, without a permit from the Secretary of Agriculture, of any virus, serum, toxin or analogous product for use in the treatment of domestic animals, and in the importation of any worthless, contaminated, dangerous, or harmful virus, serum, toxin, or analogous product for use in the treatment of domestic animals, are hereby prohibited. The Secretary of Agriculture is hereby authorized to cause the Bureau of Animal Industry to examine and inspect all viruses, serums, toxins, and analogous products, for use in the treatment of domestic animals, which are being imported or offered for importation into the United States, to determine whether such viruses, serums, toxins, and analogous products are worthless, contaminated, dangerous, or harmful, and if it shall appear that any such virus, serum, toxin, or analogous product, for use in the treatment of domestic animals, is worthless, contaminated, dangerous, or harmful, the same shall be denied entry and shall be destroyed or returned at the expense of the owner or importer. That the Secretary of Agriculture be, and hereby is, authorized to make and promulgate from time to time such rules and regulations as may be necessary to prevent the preparation, sale, barter, exchange, or shipment as aforesaid of any worthless, contaminated, dangerous, or harmful virus, serum, toxin, or analogous product for use in the treatment of domestic animals, and to issue, suspend, and revoke licenses for the maintenance of establishments for the preparation of viruses, serums, toxins, and analogous products, for use in the treatment of domestic animals, intended for sale, barter, exchange, or shipment as aforesaid. The Secretary of Agriculture is hereby authorized to issue permits for the importation into the United States of viruses, serums, toxins, and analogous products, for use in the treatment of domestic animals, which are not worthless, contaminated, dangerous, or harmful. All licenses issued under authority of this Act to establishments where such viruses, serums, toxins, or analogous products are prepared for sale, barter, exchange, or shipment as aforesaid, shall be issued on condition that the licensee shall permit the inspection of such establishments and of such products and their preparation; and the Secretary of Agriculture may suspend or revoke any permit or license issued under authority of this Act, after opportunity for hearing has been granted the licensee or importer, when the Secretary of Agriculture is satisfied that such license or permit is being used to facilitate or effect the preparation, sale, barter, exchange, or shipment as aforesaid, or the importation into the United States of any worthless, contaminated, dangerous, or harmful virus, serum, toxin, or analogous product for use in the treatment of domestic animals. That any officer, agent, or employee of the Department of Agriculture duly authorized by the Secretary of Agriculture for the purpose may, at any hour during the daytime or night time, enter and inspect any establishment licensed under this Act where

any virus, serum, toxin, or analogous product for use in the treatment of domestic animals is prepared for sale, barter, exchange, or shipment as aforesaid. That any person, firm, or corporation who shall violate any of the provisions of this Act shall be deemed guilty of a misdemeanor, and shall, upon conviction, be punished by a fine of not exceeding \$1,000 or by imprisonment not exceeding one year, or by both such fine and imprisonment in the discretion of the court."

REGULATION 1

"For the purpose of these regulations viruses, serums, toxins, and analogous products shall include all viruses, serums, toxins, and analogous products intended for use in the treatment of domestic animals. Among such analogous products are antitoxins, vaccines, tuberculins, malleins, microorganisms, killed microorganisms, and products of microorganisms.

REGULATION 2

"No person, firm, or corporation shall prepare, sell, barter, or exchange in the District of Columbia, or in any territory of the United States or in any place under the jurisdiction of the United States, or ship or deliver for shipment from one State or Territory or the District of Columbia to any other State or Territory or the District of Columbia any virus, serum, toxin, or analogous product manufactured within the United States unless and until the said virus, serum, toxin or analogous product shall have been prepared at an establishment holding an unsuspended and unrevoked license issued by the Secretary of Agriculture.

REGULATION 3

"Each establishment in the United States at which any virus, serum, toxin, or analogous product is prepared shall make application in writing to the Secretary of Agriculture for a license. When one competitor conducts more than one establishment a separate application shall be made for a license for each establishment. Blank forms of application will be furnished upon request addressed to the Bureau of Animal Industry, Washington, D. C.

REGULATION 4

"Sec 1. A license will not be issued unless the condition of the establishment and the methods of preparation are such as reasonably to insure that the product will accomplish the objects for which it is intended, and that such product is not worthless, contaminated, dangerous, or harmful.

Sec. 2. A license will be issued only after inspection of the establishment by a duly authorized officer, agent, or employee of the Bureau of Animal Industry has shown that the condition and equipment of the establishment and the methods of preparation are in conformity with these regulations.

REGULATION 5

"Section 1. Each license shall terminate at the end of the calendar year during which it is issued.

"Sec. 2. A license shall be reissued only after inspection of the establishment by a duly authorized officer, agent, or employee of the Bureau of Animal Industry.

Sec. 3. A license will not be issued for the preparation of any virus, serum, toxin, or analogous product if advertised so as to mislead or deceive the purchaser or if the package or container in which the same is intended to be sold, bartered, exchanged, or shipped, bears or contains any statement, design, or device which is false or misleading in any particular.

REGULATION 6

"Licenses shall be in the following form:

United States Veterinary License No.....

Washington, D. C.,.....19....

This is to certify that, pursuant to the terms of the act of Congress approved March 4, 1913 (37 Stat., 832), governing the preparation, sale, barter, exchange, shipment, and importation of viruses, serums, toxins, and analogous products intended for use in the treatment of domestic animals.....is hereby licensed to maintain, at.....Street, city or town of.....State of.....an establishment for the preparation of.....during the calendar year 19....

This license is subject to suspension or revocation if the licensee violates or fails to comply with any provision of said act approved March 4, 1913, or of the regulations made thereunder

Countersigned:

.....
Secretary of Agriculture.

.....
Chief Bureau of Animal Industry.

REGULATION 7

"Section 1. Each separate container of virus, serum, toxin, or analogous product prepared, sold, bartered, exchanged, shipped, or delivered for shipment shall bear the true name of the product and the license number assigned by the department, in the following manner: 'U. S. Veterinary License No.....' or an abbreviation thereof authorized by the Bureau of Animal Industry.

"Sec. 2. Each separate container of virus, serum, toxin, or analogous product shall bear a serial number affixed by the licensee for identification of the product with the records of preparation thereof. Each container shall also bear the 'return date.'

REGULATION 8

"A license will be suspended or revoked (1) if it appears that the construction of the establishment licensed is defective, or if the establishment is improperly conducted; (2) if the methods of preparation are faulty, or if the products contain impurities or lack potency; (3) if the products are advertised or labeled so as to mislead or deceive the purchaser in any particular; (4) if the license is used to facilitate or effect the preparation, sale, barter, exchange, or shipment of any worthless, contaminated, dangerous, or harmful

virus, serum, toxin, or analogous product; or (5) if the licensee violates or fails to comply with any provision of said act approved March 4, 1913, or of the regulations made thereunder

REGULATION 9

"Section 1. Each importer of any virus, serum, toxin, or analogous product shall make application in writing to the Secretary of Agriculture for a permit. The application shall specify the port or ports of entry at which the imported articles will be cleared through the customs. Blank forms of application will be furnished upon request addressed to the Bureau of Animal Industry, Washington, D. C.

"Sec. 2. Each application for a permit shall be accompanied by the affidavit of the actual manufacturer, produced before an American consular officer, stating that the virus, serum, toxin, or analogous product mentioned therein is not worthless, contaminated, dangerous, or harmful, whether the product was derived from animals and, if so derived, that such animals have not been exposed to any infectious or contagious disease, except as may be essential in the preparation of the product and as specified in the affidavit.

"Sec. 3. Each application for a permit shall be accompanied by the written consent of the actual manufacturer that properly accredited officers, agents, and employees of the Department of Agriculture shall have the privilege of inspecting, without previous notification, all parts of the establishment at which such virus, serum, toxin, or analogous product is prepared, and all processes of preparation of such products, at such times as may be demanded by the aforesaid officers, agents or employees.

"Sec. 4. Each permit shall terminate at the end of the calendar year during which it is issued.

REGULATION 10

"Permits shall be in the following form:

United States Veterinary Permit No.....

Washington, D. C.....191...

This is to certify that pursuant to the terms of the act of Congress approved March 4, 1913 (37 Stat., 832), governing the preparation, sale, barter, exchange, shipment, and importation of viruses, serums, toxins, and analogous products intended for use in the treatment of domestic animals,.....State of..... is hereby authorized, so far as the jurisdiction of the Department of Agriculture is concerned, to import.....manufactured by.....of....., into the United States through the port of....., during the calendar year 19....

This permit is subject to suspension or revocation if the per-

mittee violates or fails to comply with any provision of the said act approved March 4, 1913, or of the regulations made thereunder.

(L. S.)

Countersigned:

Secretary of Agriculture

Chief Bureau of Animal Industry.

The bureau of Animal Industry shall give prompt notice of the issue of each permit to collectors of customs at the ports of entry named therein.

REGULATION 11

"Section 1. Each separate container of virus, serum, toxin, or analogous product imported shall bear the true name of the product and the permit number assigned by the department, in the following manner: 'U. S. Veterinary Permit No. ' or an abbreviation thereof authorized by the Bureau of Animal Industry.

Sec. 2. Each separate container of virus, serum, toxin, or analogous product imported shall bear a serial number affixed by the manufacturer for identification of the product with the record of preparation thereof. Each container shall also bear the 'return date.'

"Sec. 3. A permit will not be issued for the importation of any virus, serum, toxin, or analogous product if advertised so as to mislead or deceive the purchaser or if the package or container in which the same is intended to be sold, bartered, exchanged, shipped, or imported bears or contains any statement, design, or device which is false or misleading in any particular.

REGULATION 12

"Permits will be suspended or revoked (1) if it appears that the construction of the establishment in which the products are prepared is defective, or if the establishment is improperly conducted; (2) if the methods of preparation are faulty, or if the products contain impurities or lack potency; (3) if the products are advertised or labeled so as to mislead or deceive the purchaser in any particular; (4) if the permit is used to facilitate or effect the importation of any worthless, contaminated, dangerous, or harmful virus, serum, toxin, or analogous product; or (5) if the permittee violates or fails to comply with any provision of said act approved March 4, 1913, or of the regulations made thereunder.

REGULATION 13

"Any officer, agent or employee of the Department of Agriculture, duly authorized for the purpose, shall be permitted to enter any establishment licensed under these regulations at any hour during the daytime or night time, and such duly authorized officer, agent, or employee shall be permitted to inspect, without previous notification, the entire premises of the establishment, including all compartments and buildings, and all equipment, such as chemicals,

instruments, apparatus, etc. as well as the methods used in the preparation, handling, and distribution of virus, serum, toxin, or analogous product.

REGULATION 14

“No grinding or mixing machinery, molds, instruments, tables, or other apparatus which come in contact with virulent or attenuated micro-organisms or toxins shall be used in the preparation of other forms of biological products.

REGULATION 15

“All equipment, containers, machinery, instruments, and other apparatus used in the preparation of viruses, serums, toxins, or analogous products shall be thoroughly sterilized before use by live steam at a temperature of at least 120 degrees Centigrade for not less than half an hour or exposed to dry heat of at least 160 degrees Centigrade for at least one hour. If for any reason such sterilization can not be applied, then a process known to be equally efficacious in destroying microorganisms and their spores may be substituted.

REGULATION 16

“Permanent detailed records of the methods of preparation of viruses, serums, toxins, and analogous products, including sources of bacterial cultures or viruses used, virulence of such cultures or viruses, methods of testing the purity and potency of the product, together with the methods of preservation, shall be kept by each licensed establishment.

REGULATION 17

“Section 1. The stables or other premises used for experiment animals in the production or testing of viruses, serums, toxins, or analogous products shall be properly ventilated and lighted, appropriately drained and guttered, and kept in good sanitary condition. Animals infected with or exposed to any infectious, contagious, or communicable disease shall be properly segregated, and all instruments, containers, and other apparatus shall be thoroughly cleaned and sterilized before use. Establishments shall be so located as to avoid the spread of disease, and suitable arrangements shall be made for the disposal of all refuse.

“Sec. 2. Viruses, serums, toxins, and analogous products shall be prepared, handled, and distributed with due sanitary precautions.

REGULATION 18

“When the preparation of viruses, serums, toxins, and analogous product has been completed, said products shall be stored in a cold chamber or refrigerator for preservation until such time as they are removed from the premises. All dealers in the District of Columbia or any Territory or any place under the jurisdiction of the United States shall keep such products under refrigeration until sold or otherwise disposed of.

REGULATION 19

"Section 1. Samples of viruses, serums, toxins, and analogous products shall be collected by authorized officers, agents, or employees of the Department of Agriculture.

"Sec. 2. Samples may be purchased in the open market, and the marks, brands, or tags upon the package or wrapper thereof shall be noted. The collector shall note the names of the vendor and the agent of the vendor who made the sale, together with the date of purchase. The collector shall purchase representative samples.

"Sec. 3. All samples or parts of samples shall be sealed by the collector and marked with identifying marks.

REGULATION 20

"The immunity unit for measuring the strength of tetanus antitoxin shall be 10 times the least quantity of antitetanic serum necessary to save the life of a 350-gram guinea pig for 96 hours against the official test dose of the standard toxin furnished by the Hygienic Laboratory of the United States Public Health Service.

REGULATION 21

"Section 1. Licenses or permits may be suspended or revoked after opportunity for hearing has been granted to the licensee or importer at times and places designated by the Secretary of Agriculture. All hearings shall be private and confined to questions of fact. The parties interested may appear in person or by attorney, and may submit oral or written evidence on the question of fact involved.

"Sec. 2. If, after opportunity for hearing has been granted, it appears that a licensee or permittee has violated or failed to comply with any provision of said act approved March 4, 1913, or of the regulations made thereunder, the license or permit may be suspended or revoked."

On Sept. 15th, 1915, the above regulations were amended by the additions of the three following regulations:—

REGULATION 22

"Section 1. All antihog-cholera serum and hog-cholera virus shall be prepared, handled, stored, marked, treated, and tested by the establishment in accordance with methods prescribed by the Chief of the Bureau of Animal Industry."

REGULATION 23

"Section 1. The following facilities, and such others as may be essential to efficient conduct of inspection, shall be furnished by each person, firm, or corporation licensed to prepare antihog-cholera serum and hog-cholera virus.

"Suitable rooms, compartments, or receptacles in such number and places as may be necessary for holding any viruses, serums, toxins, or analogous products for treatment or testing required in accordance with these regulations. Such rooms, compartments, or

receptacles shall be equipped for secure locking and shall be held under locks furnished by the Department of Agriculture, the keys of which shall not leave the custody of employees of the Bureau of Animal Industry."

REGULATION 24

"Section 1. No animal from public stockyards, abattoir pens, or similar places; no animal which is infected with, or which has been exposed to, any infectious, contagious, or communicable disease shall be brought onto the premises of any licensed establishment at which any antihog-cholera serum or hog-cholera virus is prepared.

Sec. 2. No virus, serum, toxin, or analogous product which has not been prepared, handled, stored, marked, treated, and tested in accordance with methods prescribed by the Chief of the Bureau of Animal Industry, or which is worthless, contaminated, dangerous, or harmful, shall be brought onto the premises of any licensed establishment at which any antihog-cholera serum or hog-cholera virus is prepared.

"Sec. 3. Each licensed establishment shall adopt such measures as the Chief of the Bureau of Animal Industry shall, from time to time, prescribe for carrying out the provisions of this regulation."

RECOMMENDATIONS OF THE COMMITTEE

In conclusion the committee desires to make the following recommendations to veterinarians and swine owners relative to the prevention of hog cholera, namely:

1. The diagnosis should be made as early as possible after symptoms appear. This must be made in the field by the practitioner.

2. Every farm on which hog cholera is found should be quarantined against that disease. No one should be allowed to go near the affected hogs except those having charge of them and no one from these premises should go to other premises on which hogs are kept.

3. In herds that are infected the well hogs should be immunized with anti-hog-cholera serum and the sick ones given serum if indicated.

4. There should be rigidly enforced regulations, and statutes if necessary, that no hogs should be sent from infected farms to the market until at least two weeks after all evidence of disease had disappeared from the herd. As hog cholera virus is carried in the carcasses of infected hogs and the disease often spreads to uninfected territory by shipping infected carcasses, it is very important

that such animals should be kept out of the market. As the disease can, by the use of the serum, be checked in the herd there is no longer an economic reason for rushing apparently healthy hogs from infected herds to the market.

5. Strict sanitary regulations should be enforced by every hog raiser to prevent the entrance of the virus. We are confronted with the fact that while the serum seems to be more potent than heretofore, hog cholera is spreading more or less rapidly to uninfected territory. We must not confuse the protection of hogs in an infected herd with the control of the disease. No one who is interested in the eradication of hog cholera can consider the serum other than a most valuable temporary agent in solving a great sanitary problem.

6. The simultaneous method of using serum and virus should be restricted to those versed in its significance and carefully trained in the technique of administering viruses.

7. All hogs that are shown at fairs should receive serum alone not more than three weeks prior to shipping (preferably near date of shipping) and serum alone at intervals of twenty-one days while they are on the road, or else they should receive simultaneous treatment not less than three weeks prior to their departure for the showing. If simultaneous treatment is given the animals should be dipped before they are shipped.

—O—

PRESIDENT MARSHALL: You have now heard the report of the Committee on Diseases. Gentlemen, what will you do with this report?

DR. KINSLEY: I move that it be accepted.

DR. MOORE: I second the motion.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the Committee on Diseases be accepted. Any remarks? If not, it is so ordered. Before we adjourn, I wish to state that the executive committee will meet in the morning at 8:30. The general session will meet in this room at 9:30 in the morning. Please be prompt for we are late with the program at the present time, and if we do not get together promptly, we will lose some valuable time. The motion to adjourn is in order. Adjournment.

Oakland, California, August 31, 1915.

The third business session of the fifty-second annual convention of the American Veterinary Medical Association was called to order by the President, Clarence J. Marshall, at 9:45 o'clock A. M.

PRESIDENT MARSHALL: The first thing on the program is the completion of the report of the executive committee.

DR. MAYO: I will read the names of the members admitted to membership, beginning where we left off last night. (Printed in the October number).

DR. MAYO: All those applicants whose names I have read have been approved by the executive committee, and recommended for election to membership in this association.

PRESIDENT MARSHALL: What is your pleasure, gentlemen, in regard to the applications presented by the executive committee?

DR. KINSLEY: Mr. President, I recall one name last year whose application was laid on the table and not voted on, Dr. Femaha, I believe was the name.

PRESIDENT MARSHALL: He is a member, Dr. Kinsley.

DR. KINSLEY: Mr. President, I move the rules be suspended and the secretary be instructed to cast the ballot of the association in favor of these gentlemen whose names have been read for election to membership of the association as recommended by the executive committee.

PRESIDENT MARSHALL: It has been moved and seconded that the rules be suspended and that the secretary be instructed to cast the unanimous ballot of the association in favor of the gentlemen whose names have just been read. All those in favor of the motion, signify by saying "aye". All those opposed by the same sign. It is carried.

DR. MAYO: In accordance with the resolution and motion I hereby cast the ballot of the association in favor of the several gentlemen whose names have been read, and which were presented last night and today.

PRESIDENT MARSHALL: There are just a few other things that should be taken up at this time and can be disposed of in five minutes, if you will permit. If there are no objections, the secretary will continue the reading of the report of the committee. His time is up, but if there are no objections, he may continue.

DR. MAYO: Roy Riddle of Winchester, Canada, has been recommended for expulsion from the association. I will say in explanation that Mr. Roy Riddle has been convicted of a crime and is serving sentence.

DR. HOSKINS: Mr. Chairman, I move the association accept the recommendation of the executive committee suspending Roy Riddle.

PRESIDENT MARSHALL: It has been moved and seconded that the recommendation of the executive committee expelling Roy Riddle be accepted. Any remarks? If not, it is so ordered.

DR. MAYO: The following resignations have been presented and the committee recommend that they be accepted:

Barnett, Joseph A. of Edwardsville, Illinois.

Belaire, George H. of Pembroke, Canada.

Bretz, S. E. of Nevada, Ohio.

Brown, Charles W. of Berkeley, California.

Fry, E. S., of Naperville, Illinois.

Hope, J. G. of the Union Stock Yards, of Chicago, Ill.

Massie, J. of Kingston, Ontario, Canada.

Morrison, William of Los Angeles, California.

C. Jones of Winnipeg, Manitoba.

DR. HOSKINS: I move that the recommendation of the executive committee that the above mentioned resignations be accepted, be approved. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: You have heard the motion, gentlemen. Any remarks? If not, it is so ordered. I wish to announce a few appointments on the different committees. Some of the regular committees are not present. It is necessary, therefore, to appoint others who are present to serve in the place of the absentees. The first is the finance committee, the regular committee was composed of James T. Glennon, Chairman, Charles R. Jolly and A. S. Cooley. As none of the gentlemen are present, I will appoint in the place of these men the following: chairman, George H. Hart, Frank Schneider and George W. Dunphy. The committee on necrology consists of W. Herbert Lowe, chairman, and the members of the committee are S. Brenton, George H. Berns, Orville L. Boor and A. Bostrom. As Dr. Brenton is the only member of that committee present I will appoint in place of the absentees the following: Dr. D. M. Campbell, Dr. Roberts, Dr. S. Stewart and Dr. Anderson. The next order of business is the report of the committee on finance. Is Dr. Hartman in the room? If not, we will pass to the report of the committee on publication. Dr. Mohler—is Dr. Mohler present?

DR. MOHLER: Mr. President, gentlemen of the convention, your committee on publication for the year 1913 and 1914 beg to submit the following report through me as chairman:

REPORT OF THE COMMITTEE ON PUBLICATION

“The preceding committee on publication contracted for the services of Mr. Charles F. Roberts as official stenographer with three assistants for the fiftieth annual meeting of the convention held at New York City, September, 1913. The expenses in connection with this stenographic work were considerably in excess of that at previous conventions owing to the unusually large number of papers presented and the division of the meeting into four sections each of which had to be covered continuously by a separate reporter. As a result the stenographic expenses for the fiftieth anniversary meeting exceeded the previous highest cost by over sixty per cent, as follows:

To attendance and reporting sessions of the executive committee and of session of A. V. M. A. meeting at New York, Aug. 30th to Sept. 1, 2, 3, 4, 5, 1913, at \$10.00.....	\$ 60.00
To traveling allowance per agreement.....	15.00
To 468 folios, copy at 15c.....	70.20
To 38 folios, executive committee reports at 15c	6.70
Paid John H. Holmes for services as assistant and reporter.....	154.40

Paid expenses of John H. Holmes.....	5.84	
Due L. W. Cogswell for services as assistant and reporter.....	154.40	
Paid expenses of L. W. Cogswell.....	9.25	
Due F. L. Knox for services as assistant re- porter	234.15	
Paid Hotel Astor for rooms for Messrs. Holmes, Cogswell and Knox.....	33.00	\$673.64
CREDIT.		
Sept. 5, 1913.....	\$200.00	
Nov. 8, 1913.....	473.64	\$673.64

Immediately following the appointment of this committee by President Marshall, invitations for bids to print the proceedings of the New York meeting were submitted to seven publishing houses in a letter somewhat similar to that used by preceding committees. As the result of a majority vote of your committee, the contract was awarded to the William J. Dornan Publishing Company of Philadelphia, and the substantial and attractive character of their production has caused very favorable comment and speaks for itself. The successful bid is herewith attached. It is gratifying to observe that although the anniversary meeting lasted five days instead of the customary four days, and consisted of as many as four section meetings at one time with consequent large increase in the number of papers and volume of discussions, the 2500 copies, each containing 1084 pages and weighing $4\frac{1}{4}$ pounds, were contracted for at \$3434.98, or \$1.37 per copy. Adding to this cost of printing that of distribution, stenographic charges and incidental expenses, the price per copy becomes \$2.00, or the same cost as the 1911 volume, and but 20 cents more than the 1912 volume. The fiftieth anniversary number greatly exceeds in volume that of any former year in the history of the association, and contains over fifty per cent more pages than the preceding report. The editorial work which this has imposed upon your committee, while onerous and exacting, has been a source of much pleasure and gratification.

The distribution of the copies of the proceedings began in January, 1914, which, considering the great amount of work connected with this production, was possible only through the hearty co-operation of the publishers and those who took part in the program. Most of the books were distributed by mail, which owing to the weight, cost 35 cents per copy for postage. Had your committee been slower in preparing the manuscript for publication, consider-

able saving in distributing expense would have occurred, as the Post Office Department on March 27, 1914, modified its regulations so that instead of sending the books as third-class matter at one cent for two ounces, we could have mailed them by parcel's post for as low as nine cents per volume.

At the New York meeting of the association the subject of a wider distribution of the proceedings was again revived, which resulted in the adoption of a resolution authorizing the librarian to forward copies of the report to certain specified veterinary colleges and similar institutions in foreign countries. Your committee, being supplied with the names of all these various institutions throughout the world which should receive a copy of the report, obtained the approval of librarian Frost to forward copies through the International Library Exchange of the Smithsonian Institute without expense to our association. As a result it has been the pleasure of your committee to see for the first time reviews of the proceedings of a highly satisfactory character in a number of foreign veterinary periodicals, and it is the opinion of the committee that a similar resolution should be adopted and made permanent this year in order that our publications may receive the attention they merit from those engaged in any line of veterinary work. The expense incident to publishing extra copies for this purpose was at the rate of \$55.00 per hundred copies, a very insignificant cost for making our association a world power in the veterinary profession.

The thanks of the committee are hereby extended to the *American Veterinary Review* for its kindness in loaning two half-tone plates of the officers of the association for the proceedings.

The usual letter inviting bids for the stenographic work incident to reporting the proceedings of the Oakland, California, meeting, August 30 to September 2, 1915, was forwarded to six individuals, and the majority of your committee voted that it would be most economical and satisfactory to accept the lowest bid submitted, that of B. C. Spencer, the official stenographer of the Missouri Valley Veterinary Association for the last five years.

The total disbursements made under the directions of this committee are summarized as follows:

November, 1913, Mr. C. F. Roberts, per contract . . .	\$ 673.64
February, 1914, William J. Dornan Publishing Co., bill approved	3434.98
February, 1914, postage for mailing reports	662.10

June, 1914, Chairman Publication Committee, salary
and incidental expenses..... 324.55

\$5095.27

Through the courtesy of the *American Journal of Veterinary Medicine* free advertisement was given to this anniversary volume for the purpose of selling some extra copies. The proceeds from such sales which will be referred to in the librarian's report should be credited to the expense of publication.

Respectfully submitted

J. R. MOHLER, Chairman,

R. W. ELLIS

J. H. BLATTENBERG

N. S. MAYO

WARD GILTNER

WILLIAM J. DORNAN

Rittenhouse Building, Nos. 701-709 Arch Street
Philadelphia, 11-12-13.

MR. JOHN R. MOHLER,
Washington, D. C.,

DEAR SIR:—

We are pleased to estimate printing, paper, binding, wrapping and addressing—2000 copies AMERICAN VETERINARY MEDICAL ASSOCIATION, as follows:

Plain matter—\$2.58 per page.

6 point Tabular—\$7.00 per page.

Alterations—90 cents per hour.

Each additional page over 1000 pages—\$2.58.

Each additional 100 copies, 1000 pages—\$55.00.

2000 inserts printed on coated paper—\$8.00 for each insert.

Zinc cuts 7 cents per square inch, minimum 70 cents.

Halftone cuts 18 cents per square inch, minimum \$2.00.

Photographs to be supplied by customer.

This estimate is based on binding the book in cloth, gold stamp on back, blind fillet 2 sides, plain edges. If gold tops, 5 cents per book extra.

Very truly yours,

WILLIAM J. DORNAN.

Dummy enclosed with book sent by express prepaid.

PRESIDENT MARSHALL: Gentlemen, you have heard the report of the publication committee. What is your pleasure,

DR. KINSLEY: I move it be adopted. Seconded.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the publication committee as read by Dr. Mohler be adopted. All those in favor of the motion signify by the usual sign; those opposed by the same sign. It is carried. It is so ordered.

In order to facilitate the work of the executive committee, it has been deemed advisable to have some of the reports of the various officers presented for our consideration at this time. These are scheduled according to the printed program to be presented Thursday afternoon, but if there is no objection we would like to have these reports presented at this time, and will now hear the report of the Secretary-Treasurer and Librarian at this time. If there are no objections, Dr. Mayo will read his report as Secretary.

DR. MAYO: I will first read the report of the Librarian as it bears somewhat upon the report of the publication committee. The report of the librarian covers the period from August 1st, 1913 to August 1st, 1915. (Printed in the October number).

PRESIDENT MARSHALL: Gentlemen, you have heard the report of the Librarian. What do you wish to do with it?

DR. KINSLEY: I move that it be adopted, accepted and referred to the executive committee.

PRESIDENT MARSHALL: Any remarks? If there are no objections, it is so ordered.

(The secretary's report was printed in the October number).

DR. JENSEN: Dr. Mayo, I am advised that Dr. R. R. Hammond, at Geneseo, Iowa, and Dr. W. E. Ralston, at Pullman, Washington, are dead.

PRESIDENT MARSHALL: I also am informed that Dr. James A. McClosky is also dead.

DR. KINSLEY: I move that the report of the secretary be accepted and referred to the executive committee.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the secretary be accepted and referred to the executive committee. Any remarks? If not, it is so ordered.

DR. MAYO: Dr. Campbell will present the report of the treasurer, but before that is done I wish to go upstairs and get the printed report for distribution so that all may have a copy before them while it is being read.

PRESIDENT MARSHALL: While Dr. Mayo is gone we will hear the report of the finance committee, which Dr. Hart, the chairman will read. (Printed in the October number).

PRESIDENT MARSHALL: Gentlemen, you have heard the report of your finance committee. What is your pleasure?

DR. KINSLEY: I move that the report be received. Seconded by Dr. Hoskins.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the finance committee be accepted. All those in favor of the motion signify by saying "aye"; those opposed "no." Carried. It is so ordered.

Dr. Campbell then read the report of the treasurer. (Printed in the October number).

PRESIDENT MARSHALL: Gentlemen, what will you do with this report?

DR. HOSKINS: I move it be received. Seconded by Dr. Jensen.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the treasurer be received. All those in favor signify by saying "aye"; those opposed "no." It is carried. The report is received.

The next order of business is the report of the Committee on Neurology. Dr. Campbell, who is to make that report is not present at this time. The next on the program is the report of the committee on resolutions. Dr. Mohler, is your report ready?

DR. MOHLER: I do not think it is ready now, Mr. President.

PRESIDENT MARSHALL: Is Dr. Rutherford present? If not, we will postpone the reading of the report of the international tuberculosis commission by Dr. Rutherford, chairman.

DR. V. A. MOORE: Dr. Rutherford has called a meeting of that committee for three o'clock this afternoon. We will have to have a little more time to make a report.

PRESIDENT MARSHALL: We have a little more time yet to spend if Dr. Hoskins is ready, and he informs me that he is, we will now hear the report of the Committee on Legislation, if there are no objections. (Printed in the October number).

PRESIDENT MARSHALL: You have heard the report of the committee on legislation. What is your pleasure?

DR. KINSLEY: I move that the report of the legislative committee be accepted. Seconded.

PRESIDENT MARSHALL: A motion has been made and seconded that this report be accepted. Any remarks? If not, all those in favor of the motion say "aye"; opposed "no." Carried. It is so ordered.

DR. JENSEN: Mr. Chairman, it seems to me, if I am not out of order, that this association is greatly indebted to Dr. Hoskins for the untiring energy of this committee, and I move you that a vote of thanks be extended to the doctor for the work he has done in this respect. Seconded.

PRESIDENT MARSHALL: Any remarks? If not, gentlemen, you have heard the motion. All in favor of that, stand up. I am pleased to announce that everybody has stood up except Dr. Hoskins, which was entirely proper. The vote is unanimous and it is so ordered. That completes the regular program of the morning, and if anyone has anything else to say, we will have time to consider it now. If there is any unfinished business, we can take it up now.

DR. DALRYMPLE: Mr. Chairman, I wish you would advise us as to the personnel of the committee on resolutions.

PRESIDENT MARSHALL: The resolutions committee is as follows:

Dr. Melvin not being present, the chairman is Dr. E. H. Shepard, and the members are Dr. Dalrymple, Dr. Rutherford, Dr. Norton and Dr. Milton. I see that Dr. Shepard is now present and we will have his report.

DR. SHEPARD: I will say that the committee is not ready to report, and will ask if anyone has any resolution that they wish to have offered, that they present them to the committee as early as possible.

PRESIDENT MARSHALL: While we have nothing else before the house. Dr. Hoskins informs me he is prepared to offer a memorial in reference to Dr. Salmon, and if there are no objections, I think we might hear Dr. Hoskins's memorial address at the present time. (Printed in the October number).

(To be continued)

SOCIETY MEETINGS

MASSACHUSETTES VETERINARY MEDICAL ASSOCIATION

The monthly meeting of the Massachusetts Veterinary Medical Association was held at Worcester, on Wednesday, Sept. 15th. The members of the association were the guests of Mr. Harry Worcester Smith. Any person ever having been to Mr. Smith's estate or knowing Mr. Smith, knows what a good time was in store for the members. Besides an unlimited supply of refreshments of all kinds, the members were treated to an exhibition of pictures of jumpers and runners both past and present, their good and bad points being thoroughly explained by the owner. A tour was then made through the residence which was a real store house of antique furniture, silver, pictures, etc. This was followed by an exhibition of Mr. Smith's well known string of jumpers which showed to good advantage the excellent training which they have had. An exhibition of the different forms of jump, such as fence, brush, double and cross country, was then given us. This was followed by a trip through the kennels where Mr. Smith's fine packs of hounds were seen and greatly admired by the members.

The party returned to Worcester at 6 P. M., and met at the Hotel Bancroft. Fifty members and friends sat down to dinner after which the meeting was called to order by President Plaskett.

The records of the previous meeting were approved as read. Dr. Plaskett presented Mr. Smith with a shoe worn by the famous horse "Smuggler" which was owned by Howard Russell. The Secretary reported that the following members had been notified that according to the Constitution they were exempt from the further payment of dues:—Drs. John Winchester, W. A. Sherman, Wm. Peterson, Geo. Penniman, Austin Peters, Ben. Pierce, Lester H. Howard, Daniel Emerson, Alexander Burr, Thomas Blackwood.

On inquiry Dr. Howard spoke on the unusual outbreak of haemorrhagic septicaemia which has prevailed throughout the state of Massachusetts this year. Dr. Howard thought that the cause was due to the unusually heavy rains and the consequent inundations of land. Dr. Howard further stated that there has been a decrease of 50% in the cases of glanders in Boston this year which more than compensates for the slight increase in number of cases outside of Boston. He attributed a large part of the decrease to the fact that the watering troughs were closed, and said that the

year following the closure of the watering troughs showed a decrease of 40% in the number of cases as compared with six years previous to the closure.

Drs. Maloney, Lukes, Ben. Pierce, Abele and Penniman spoke and paid tributes to Mr. Smith as the true exponent of real sport. A committee composed of Drs. Winslow, Howard and Penniman were appointed to send a letter of congratulation to Mr. Laselle, on his winning the Grand Sweepstake. A rising vote of thanks was given Mr. Smith and the entire gathering joined in singing "For He's a Jolly Good Fellow." Adjourned at 9 P. M.

EDW. A. CAHILL, Secretary.

The regular monthly meeting of the Massachusetts Veterinary Medical Association was held at Young's Hotel, Boston, on Wednesday, Oct. 27th, at 5 P. M. The meeting was called to order by President Plaskett. The records of the last meeting were read by the Secretary. A correction was made by Dr. Howard to the effect that the decrease in cases of glanders in Boston for the past year has been 50% instead of 15%. Records approved as corrected. Dr. Pierce requested more time on his report on Dr. Buckley's diploma. The Committee appointed to draw up a letter of congratulation to Mr. Lasalle requested more time.

The following men were admitted to membership:

Dr. Edward F. Carey, Fall River.

Dr. William J. Glasgow, Springfield.

Dr. Michael J. Cone, Pittsfield.

Dr. M. E. Chapin, Springfield.

Dr. J. J. Moynahan, Holyoke.

Dr. Winchester remarked that he had received notice of the death of Madame Liautard, wife of our esteemed confrere, Dr. Liautard, of Paris, and suggested that a message of condolence be sent. Dr. Burr moved that a committee of two be appointed to draw up resolutions. President Plaskett appointed Drs. Burr and Winchester.

President Plaskett appointed Drs. Abele, Burr and White to constitute the Legislative Committee.

The special program for the evening consisted of an excellent address by Mr. H. C. Moore, President of the Pitman-Moore Company, of Indianapolis, on the production of anti-hog cholera serum and virus. Mr. Moore illustrated his remarks with stereopticon

views which were greatly enjoyed. Mr. Moore invited questions and criticisms and the meeting was resolved into a general discussion of hog cholera. About 40 members were present and this number was augmented by at least as many non-professional friends, most of whom were men owning large herds of swine. They all took part in the discussion and paid the highest tribute to the serum treatment. It was moved that a rising vote of thanks be given Mr. Moore for his excellent entertainment which was unanimously carried.

Dr. Peirce announced the program for the next meeting.

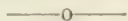
Dr. Miller of Fitchburg spoke regarding an insignia for the automobiles of veterinarians. Considerable discussion arose but no action was taken. Dr. Howard suggested that something similar to the pin worn by the A. V. M. A. members would be appropriate. He then complimented Mr. Moore on his address and stated that the Department of Animal Industry gave credit to the Pitman-Moore serum and virus for a large percentage of our good results.

Dr. Abele asked for information regarding eczema in cattle. Drs. Peirce and Howard in answer stated that several specimens had been examined from animals showing this condition, and that they showed a streptococcal and non-pathogenic bacterium. Dr. Abele further requested information on cattle from out of state coming into Massachusetts as regards foot-and-mouth disease, which was answered by Dr. Howard.

The meeting adjourned at 7:45, after which 40 members and friends sat down to dinner in the main café.

Respectfully,

(signed) EDW. A. CAHILL, Secretary.



HUDSON VALLEY VETERINARY MEDICAL SOCIETY

The first annual meeting of the Hudson Valley Veterinary Medical Society was held at Catskill, N. Y., November 3. There were about twenty-five veterinarians in attendance. The president, in his address, pointed out that while the society was only one year old, there is a membership of forty-one. The policy of the society has been not to have a formal program of papers, but to have one veterinary topic presented at each meeting with full discussion. At the Catskill meeting the topic for discussion was "Parturition and its Sequels". Those present entered into the discussion and a number of practical points were brought out. The following officers

were elected: President, D. B. Comstock, Albany; Vice-President, G. A. Knapp, Millbrook; Secretary-Treasurer, W. H. Kelly, Albany.

Board of Censors: Thos. O'Dea, Saugerties; L. L. Parker, Catskill; C. J. Hoyt, Walden; C. A. Roig, Poughkeepsie; George Eighmy, North Chatham.

It was voted that the next meeting should be held at Hudson, N. Y., February 2, 1916.

WM. HENRY KELLY, Secretary.

NECROLOGY

ALBERT BOULEWARE KELLY

Albert Bouleware Kelly of Albany, N. Y., died November 3, 1915 at the Medico-chirurgical hospital at Philadelphia, Pa. His death was caused by a fall from a ladder which resulted in a fracture at the base of the skull.

Dr. Kelly was born August 14, 1876 and was a graduate of the N. Y. State Veterinary College at Ithaca, N. Y. He was in practice a number of years at Albany and Delmar. A wife and daughter survive him. Interment in the Rural Cemetery at Albany.

J. G. Chrisman, late State Veterinarian of Texas.

COMMUNICATIONS

RABIES?

Editor Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

Dear Sir:—I have read with considerable interest Dr. V. Schaefer's case report printed in the October JOURNAL (pages 57-60) by Dr. Ellis, with editor's comment. In my opinion his title ("Rabies?") well deserves the question mark. This is no uncommon disease in the Southern states. While State Veterinarian of South Carolina I saw quite a number of cattle, and a few mules affected with this disease. Farmers are familiar with this disease and term it "Mad Itch." I have held post mortem examinations in some instances but have never been able to discover anything abnormal other than an intense inflammation of the meninges of the brain.

I sent some heads to be examined but no Negri bodies were found. The following extracts from the enclosed press bulletin issued by my friend Dr. C. A. Cary may be of interest to your readers.

M. RAY POWERS.

INFECTIOUS ITCHING DISEASE

Press Bulletin No. 76
C. A. CARY, Auburn, Ala.

This disease has been called pseudo-rabies, mad itch, bulbar paralysis and "Disease of Aujeszky." It has existed for many years in various parts of America but was definitely described by Aujeszky, of Budapest, in 1902.

The cause of the disease is unknown but the records seem to indicate that it is a specific infection not transmitted by actual contact unless there be abrasions of the skin. It has been transmitted by inoculation. One material used was blood serum. The subcutaneous tissue at point of natural infection is very virulent and the urine of an infected animal is sometimes virulent. The brain is also virulent.

Susceptible animals are the horse, cattle, sheep, goats, dogs, cats, rabbits, guinea pigs and grey mice. Horses are said to be more susceptible than donkeys but I have seen in Alabama worse cases in mules than horses. Pigs, pigeons and fowls are said to be insusceptible.

The natural mode of entrance into the animal body is by subcutaneous or by cutaneous infection. It has been reported that food containing virulent products will transmit the disease. Subdural inoculation produces the disease with the shortest period of incubation. Intra-ocular, intra-venous, intra-peritoneal or intramuscular inoculations with virulent material always produce the disease in susceptible animals. The virus is supposed to spread in the animal body by the lymph vessels and nerves.

CLINICAL SYMPTOMS: Cattle. In cattle the infection usually starts somewhere about the head, the lips and nose; and the first signs are constant rubbing of the infected part followed very quickly by removal of hair, bleeding and inflammatory swellings.

The swelling usually extends from the point of infection involving the head, throat and sometimes the neck. The animal moans, moves the legs convulsively, scratches the head or infected part with the hind legs or rubs it upon some object, and there is often some salivation and paralysis of the throat so that the animal cannot swallow. The appetite of the animal may remain good but inability to swallow and possibly inactivity of digestion results in tympanitis or flatulency. As a rule the animals are nervous, show fright, sometimes sweat, grind the teeth and moan. As a rule, they die in twenty to forty-eight hours after the first symptoms appear. Post mortem appearances show the extension of the infection to be along the lymph channels. The lymph glands of the head are enlarged. Sometimes the capsule of the lymph node is injected and

nearly always edematous. There is rarely ever any systemic temperature. During the summer and fall of 1914 about 50 cases occurred in various parts of Alabama.

HORSES OR MULES: In horses or mules this trouble may be mistaken for rabies or forage poisoning. The rubbing of the skin, the head or the parts affected until they rub away large portions of skin and flesh is the characteristic symptom. Often times the animal does not show nervous irritability or any great variation from normal except the violent itching and rubbing and throat paralysis and sometimes general paralysis from secondary infection. Occasional salivation, grinding of the teeth and attempts at swallowing may be present.

TREATMENT: The experience of all veterinarians indicate that there is no specific treatment. In fact very few cases recover. Tincture of Iodine may be freely applied to the infected place and where possible the edematous enlargements be opened and tincture of Iodine or other antiseptics may be applied and if possible tie up the animal so that it cannot rub or scratch itself. When possible give purgatives and apply covering to protect the infected places so the animal cannot scratch or rub them.

To prevent it keep animals out of infected places and disinfect such places thoroughly before any other animals are introduced. I have long suspected that this trouble was due to some volatile poison like that found in poison ivy or other poisonous plants. As a preventive measure it might be well to eradicate such plants in a pasture where this disease occurs.

The intense itching in animals closely resembles that of poison ivy in man. I have long suspected that some cattle, or other animals were subject to skin irritations and infected by poison ivy plants. A cow or horse might nibble or eat such a plant as the three-leaved poison ivy vine (*Rhus Toxicodendron*) or the small tree or shrub with seven to thirteen leaflets (*Rhus vernix*). The volatile oil (Paff) or glucoside (Smye) could produce the intense itching irritation about the head or skin at any delicate or abraded part and, along with the rubbing and scratching, germ infection may occur to intensify the irritation of the terminal sensory nerves.

With this idea in view I suggest that owners of animals affected with itching disease apply freely and frequently early in its course one per cent solutions of permanganate of potash or iron sulphate (one per cent in water) solution, two or three times a day. Also give to cattle, horses and mules one to two pounds of Epsom Salts in one to two pints of water to remove from alimentary canal any of the plants that may have been swallowed. Or use one to two pints of raw linseed oil, olive oil, castor oil or warm lard.

Rabbits die in convulsions in twenty-four to forty-eight hours after subcutaneous injections of a fluid extract of *Rhus Toxicodendron*. Necrosis and sloughing may occur at the place of injection if the rabbit lives eight to fifteen days. Also nephritis is usually present. It is said that the above lesions occur with greater certainty

and regularity in guinea pigs (Paff). There is nothing said about there being itching or scratching of the place of inoculation.

I have obtained pus micrococci from the itching areas but have not reproduced the itching effects by direct inoculation with them.

Some have suspected that the itching disease was caused by dry irritating food with insufficient water. Others have attributed the disease to some toxic plant or germ. At present there is no definite or specific known cause of the disease.

—o—

SALMON MEMORIAL COMMITTEE

DR. J. F. WINCHESTER, Chairman

DR. W. HORACE HOSKINS, Sec'y-Treas.

DR. A. D. MELVIN

DR. S. BRENTON

DR. J. S. ANDERSON

DR. J. G. RUTHERFORD

DR. D. F. FOX

Dear Doctor:—At the 51st annual meeting of the A. V. M. A. the many suggestions, offerings and proposals for some fitting testimonial to the late Dr. D. E. Salmon, were given the fullest consideration and by a vote of the association and their selection the above named committee were elected to carry out the purpose of the following adopted recommendations:—

“1st.—That the Salmon Memorial Fund shall be undertaken by this body and that a stated committee will be appointed by this organization for the carrying out of the purpose of this movement.

“2nd.—That the form of testimonial shall be of an educational character, that may cover a scholarship, a fellowship, or some advanced or special work of interest or import to the veterinary profession, as may from time to time be recommended by this committee for action of the association.

“3rd.—That to this end a sum of monies of not less than ten thousand dollars be raised by popular subscription from the upwards of seventeen thousands of veterinarians in North America; this money to be invested under the direction of this association so that the income of four or five hundred dollars may be annually awarded to some one or more along the lines above referred to.

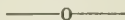
“4th.—That said scholarship or fellowship shall be in an American Veterinary College, and, if a fellowship, not to be taken in the college of which the successful person awarded the same shall be a graduate thereof.”

There are more than seventeen thousand veterinarians in the United States and Canada, all of whom owe a debt to our late co-laborer. The standing of our profession in North America and abroad has been largely contributed to by his lifetime of useful and sincere service. The form of testimonial must appeal alike to one and all in that it fittingly commends his life, that it will keep his memory green in the minds of the present and future profession and it will be a testimonial that will stimulate every young man to emulate his example of devoted, unselfish work for his profession.

Will you join with your fellow veterinarians in your immediate district and determine what you can do to aid this committee? May we invoke of you and your colleagues that you lay aside in approaching this duty every other thought, save that of the untiring and unselfish side of the more than twenty-five years of official service, that marked his splendid career.

Yours for this worthy cause,

W. HORACE HOSKINS, Sec'y-Treas.,
3452 Ludlow St., Philadelphia, Pa.



REVIEWS

VETERINARY POSOLOGY

GEORGE A. BANHAM, F.R.C.V.S AND WM. J. YOUNG, F.R.C.V.S., D.V.S.M.
Fourth Edition, 1915. Published by Alex. Eger, Chicago, Ill.

This little volume of 272 pages, bound in cloth, contains a great amount of valuable information for any practising veterinarian. Besides the tables on posology, classification of medicines, their therapeutic actions, incompatibles, diseases and their remedies, there are tables on the most important pathogenic bacteria, parasites affecting animals and protozoan diseases and their transmitters. Our space is too limited to consider the various topics in detail, but attention should be called to the tables on the percentage composition of feeding stuffs, digestive coefficients and rations for draught horses, as being especially useful for country practitioners who wish to qualify themselves in an advisory way in promoting their usefulness with their agricultural patrons.

The book has apparently been designed for English practitioners. Its utility in America would have been enhanced if the American equivalents of the weights and measures could also have been given as well as some recognition of the American pharmacopoeia. A table on the average alcoholic strength of some beverages, includes champagne and sherry which, in this country, might be considered rather extravagant for veterinary patients.

Directions are given for the administration of the subcutaneous and ophthalmic tuberculin tests, also the subcutaneous and conjunctival tests with mallein, and vaccination for swine fever and swine erysipelas. The authors are to be commended in bringing the volume up to date and for condensing so much valuable information for the practitioner into such small compass.

P. A. F.

ANAESTHESIA AND NARCOSIS OF ANIMALS AND BIRDS

FREDERICK T. G. HOBDAV, F.R.C.V.S., F.R.S.E.
Alex. Eger, Publisher, Chicago, Ill.

This is a book of 82 pages including eleven chapters which refer to the selection of an anesthetic; method of preparation and securing of the patient; general anesthetics; stages of anesthesia; antidotal treatment; local anesthetics; intraspinal anesthesia; narcotics; the treatment of the patient when recovering from the effects of an anesthetic or narcotic; hints on the choice of anesthetics for the individual species of animal.

The author believes that the progress of anesthesia in veterinary surgery has not been so rapid as it should have been and one very commendable purpose of the book is the humane one of promulgating a wider use of the anesthetics upon veterinary patients. Inhalers are recommended and various forms are illustrated, particularly with reference to the horse and dog.

Tables are printed showing very satisfactory results with chloroform anesthesia upon 300 dogs, and reference is made to a list of 500 dogs in which there was only one fatality, and two which showed dangerous symptoms but recovered. The secret of safe chloroform anesthesia is the proper admixture of air. For the cat, monkey and young puppies the A. C. E. mixture or ether is recommended. The reference to birds is limited to the ostrich and chloroform is the anesthetic chosen.

Intraspinal anesthesia, while useful in human subjects, has not found very wide application in animals. This chapter deals principally with the researches of M. Memmerat. This gentleman practised the method successfully upon twenty-five cases principally upon old dogs in which chloroform anesthesia might have proved fatal. The injections were made between the sixth and seventh lumbar vertebrae. The technic is the same for the cat as for the dog. Because of the peculiar sensibility of the cat to chloroform and ether, it is believed this method will be of great service particularly in abdominal surgery.

Although the book is not large, it contains much useful information and if it serves the purpose of extending still further the use of anesthesia in veterinary patients it will accomplish a great and good object.

P. A. F.

MISCELLANEOUS

The next meeting of the Kansas Veterinary Medical Association will be held at Kansas City, Kansas, January 5 and 6, 1916.

Dr. J. G. Chrisman, late State Veterinarian of Texas, lost his life from becoming infected with anthrax while holding a post mortem examination upon a cow dead from that disease.—*Florida Health Notes*.

Under the order of the Secretary of Agriculture effective November 5, the quarantine on foot-and-mouth disease has been revoked in New York State. The entire state is now free from quarantine.

Dr. Geo. H. Koon, of the 7th Cavalry, at present in the Philippines expects to leave for the states in January or February.

TAKING NO CHANCES ON SERUM INFECTION. Infected serum will likely not again spread foot-and-mouth disease. Stringent requirements are now exacted of the serum plants in Illinois by the Department of Agriculture. All serum made in this state must now be subjected to a 3 week's test on calves before being shipped interstate. Shipments within the state are not subject to Federal control, but it is quite likely that recent experience has put serum-makers so thoroughly on guard that contamination of their product with the infection of foot-and-mouth scarcely is possible.—*Breeder's Gazette*.

Dr. A. Mitchell, stationed at Camp Stotsenburg, Pampanga Province, Philippines, is expecting to return to this country.

Dr. W. H. Dalrymple of Baton Rouge, La., has been the recipient of a fellowship in the American Medical Association. It is a worthy honor worthily bestowed. Recognition of veterinary merit is welcome in forging a stronger bond of union between the two professions. Our congratulations are extended to Dr. Dalrymple and the American Medical Association as well.

New Mexico boasts of a veterinarian 91 years of age.

The semi-annual convention of the Louisiana Veterinary Medical Association was held at Donaldsonville, La., October 15. The next meeting will be held at New Orleans, December 18.

Dr. A. L. Tiffany, a veterinarian of Monroe, Mich., and Secretary of the driving club, has been appointed by the board of Supervisors as live stock inspector for Monroe County.

THE DURAND CATTLE KILLED. The Guernsey cattle owned by Mrs. Scott Durand in Lake county of this state, which contracted foot-and-mouth disease and which were protected from slaughter some weeks ago by injunction, were killed on Tuesday afternoon. The Supreme Court dissolved the first injunction and on effort to kill the herd a second injunction was issued on the ground that the cattle had now recovered from the disease, and hence the state had no right to slaughter them. The attorney-general advised the governor that this second injunction was void, and Gov. Dunn addressed a letter to the sheriff of Lake county, asking him to aid the board of live stock commissioners in killing the cattle. With armed deputies the sheriff complied with the governor's request. Whatever legal complications may or may not follow, the cattle are underground, and the commissioners may now address their undivided attention to continuing their aid to the Federal authorities in the clean-up of McDonough county, where the situation is not so satisfactory as it might be.—*Breeder's Gazette*.

A later report states that Governor Dunn and Secretary of Agriculture Houston have been made defendants in a suit for \$100,000 brought by Mrs. Durand.

Dr. Fred E. Davis, for some time attached to the Bureau of Animal Industry as a veterinary inspector at St. Joseph, Mo., has been transferred to the station at Richmond, Va.

Dr. H. G. Carnes of Atlanta, Ga., was re-elected president of the Georgia State Veterinary Medical Association at its ninth annual meeting held at Macon. Dr. J. W. Salter was elected vice-president and Dr. Peter Bahnsen of Americus, secretary-treasurer. A resolution was passed to continue the prosecution of quack veterinarians.

Veterinarian Thomas E. Hutchings, coroner of Nicholas County, Kentucky was elected Live Stock Inspector of Nicholas County for the ensuing year.

At the November meeting of the New Orleans Academy of Sciences held at Tulane University, the paper of the evening was given by Dr. W. H. Dalrymple of the Louisiana State University on "The History of the Cattle Tick Fight in Louisiana."

Dr. J. W. Scott of Manchester, Iowa has sold his practice of 26 years standing to Dr. C. L. Morgan of Humboldt, Iowa.

A BIG STEP TAKEN IN STOPPING SALE OF TUBERCULAR CATTLE TO FARMERS. Almost anyone can carry on a crooked business for a certain length of time and come through without being caught, but it is generally the case that if they will follow it long enough and hard enough, sooner or later they are sure to get nipped. It seems that this is about to happen to a bunch of cow dealers over in Illinois. The following, which appeared in the *Chicago Tribune* will explain itself:

James Dorsey of Gilberts, Ill., millionaire cattle king of Kane county and president of the Elgin Road Race Association, yesterday was indicted by the federal grand jury. He is charged with using the mails in a scheme to defraud farmers by selling them cattle infected with tuberculosis under guarantee that the animals had been subjected to the tuberculin test and were free from the disease. It was returned before Judge Carpenter and contains three counts.

The inquiry into Dorsey's cattle operations was one of the speediest ever conducted by a federal grand jury. All witnesses were heard, the indictment drafted, voted and returned in court in less than six hours. Assistant District Attorney Michael L. Igo examined the witnesses.

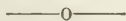
The three counts in the indictment are based on three cattle transactions with farmers between October, 1912, and May, 1913. The three farmers who charged Dorsey with selling them tubercular cattle were witnesses before the grand jury. They are John T. Milek of Sturgis, S. D.; Norman F. Alderman of Brook Park, Minn., and William Spath of Lewistown, Mo.

Other witnesses were Dr. O. E. Dyson, state veterinarian, and Dr. A. Tyler of Elgin, a veterinarian who examined and passed Dorsey's cattle, and whose license to practice subsequently was revoked.

It is to be hoped that every effort will be made by the government officials in charge of this prosecution to ferret out the true facts and bring these people to justice. If they are guilty of the things that have been charged against them, a good, stiff penitentiary sentence would hardly seem adequate to punish them as they should be. State officials and farmers and live stock men should lend every assistance to this investigation and prosecution that a stop may be put to this kind of work for all time to come.

One who will be guilty of selling a cow claiming her to be free of tuberculosis when he positively knows this animal is affected

with this disease, will do almost anything. Numerous cases are on record where little children have been known to contract this terrible disease by drinking milk from tubercular cows. Can there be any punishment too severe for a man who will knowingly sell an animal of this kind not caring one iota whether this cow will be the means of giving one child or more this terrible disease?—*Twentieth Century Farmer*.



SERUM TESTS AND THE FOOT-AND-MOUTH DISEASE

Department of Agriculture's Official Statement
Of The Origin of Present Outbreak in Northern Illinois.

Washington, D. C., October 30, 1915. An official statement in regard to the recent reappearance in northern Illinois of the foot-and-mouth disease after it had been apparently stamped out early in the year, was issued today by the United States Department of Agriculture. From this statement it appears that the outbreak has now been definitely traced to an anti-hog-cholera serum prepared from the blood of hogs infected with foot-and-mouth disease but showing at the time the serum was manufactured no symptoms of the contagion. According to the statement, the serum was thoroughly tested before it was permitted to be placed upon the market, and the tests failed to reveal any evidence of contamination. After the recurrence of the disease in Illinois, samples of the serum were tested again and again by the Department of Agriculture and also tested by the United States Public Health Service. It was not until the sixty-second animal used in the tests had been inoculated with the serum, however, that the bacteriologists of the Department were able to produce any symptoms of foot-and-mouth disease.

The Department's statement is as follows:

In October, 1914 an outbreak of foot-and-mouth disease—the first in this country in six years—was discovered in the vicinity of Niles, Michigan. Despite thorough investigation the source of the infection remains unknown. It was learned, however, that before the occurrence was reported to Washington and the disease diagnosed by veterinarians familiar with it through experience in past outbreaks, animals from the infected area had reached Chicago. Owing to the extreme contagiousness of the disease, the Union Stock Yards were quarantined (October 31). Ordinarily several days or a week elapse between infection and the appearance of symptoms, and although there was no conclusive evidence on the point it was believed possible that the animals in question might have reached the yards in the incubative stage and infected them.

On November 1 this belief was strengthened by the discovery of the disease in the cattle being exhibited at the Dairy Show in the immediate vicinity of the yards. In the yards proper, however,

the first case did not appear until November 3. The next day foot-and-mouth disease was found among the hogs at the establishment of the Great Western Serum Company. This establishment was quarantined at once and at about the same time a precautionary quarantine was also placed upon another establishment, that of the Chicago Serum Company, located about a mile away, although no actual cases of the disease had been found at this second establishment. At that time the Chicago Serum Company had on hand approximately 101,000 cubic centimeters of anti-hog-cholera serum which had been prepared late in October. All this serum was placed under official seal by the inspectors of the Department and withheld from distribution.

During the ensuing six months the disease, which had spread widely over the country, was effectively combated by the slaughter of all exposed herds. It was then decided that the law required the Department to comply with the request of the Chicago Serum Company for a test of the serum in order that if it were found safe, it might be placed upon the market. The National Serum Law gives the Department no authority to refuse to permit the sale of a serum unless it is contaminated, dangerous, or worthless.

Arrangements were accordingly made by the Chicago Serum Company for a test under the supervision of the Department. Forty-one thousand cubic centimeters of the serum were thoroughly mixed and rebottled, and on June 30 samples were injected into eight small hogs. Two cheek-hogs were also included in the test. Although injections as large as 40 cubic centimeters were used, it is certain that none of these hogs developed foot-and-mouth disease. The test being thus absolutely negative—that is to say no indications of the disease resulting from it—the company was informed that it could ship out the serum to its customers.

On August 8 the inspector in charge of field inspection at Chicago telephoned to Washington that a case of foot-and-mouth disease had been discovered in a herd which had been inoculated with this serum in Cook County, Illinois. Pending investigation, all shipments of serum produced in Chicago were at once prohibited. As a result of the investigation it was found that serum from the Chicago Serum Company had been used on eleven herds of hogs, eight of which were in Illinois and one each in Minnesota, Michigan and Indiana. Inspection showed that eight of these herds were infected with foot-and-mouth disease, although only a very small percentage of the hogs in them manifested symptoms of the disease. All the animals were, however, slaughtered at once. The three herds in which no disease was found were also slaughtered without waiting to see whether they would subsequently develop the disease or not. This measure was necessary on account of the risk that the disease might be spread by the animals while in the incubative stage. As a result of the precaution no further cases have been reported from Michigan, Minnesota or Indiana.

In addition to these measures adopted to control the spread of the disease, samples of the serum actually used were procured from the owners of the infected herds and also samples of the remaining stock of the Chicago Serum Company. Pigs and calves, the animals which are most susceptible to foot-and-mouth disease, were inoculated with these samples. The results were again negative and after two series of tests had been made, the United States Public Health Service was asked to conduct a third series. This also was negative.

Up to this time, therefore, four series of tests had been made in which a total of 52 animals had been used. None of these 52 animals developed foot-and-mouth disease and the inoculations afforded no evidence that the serum was in any way contaminated. Each subsequent series apparently only confirmed the original test made before the serum was permitted to be placed upon the market. The fact remained, however, that herds treated commercially with the serum had developed foot-and-mouth disease. A fifth test therefore was made and ten days after inoculation, the sixty-second animal which had been used in the tests, a calf which had received thirty cubic centimeters, developed characteristic lesions. The diagnosis of foot-and-mouth disease was subsequently confirmed by the inoculation of other animals with material from the infected calf.

This is regarded as proof that the suspected serum actually was infected. Why the standard tests used on 61 animals failed to reveal this fact is a matter for scientific investigation and the bacteriologists of the Department are now at work upon the problem. At the time of manufacture, one-half of one per cent of carbolic acid was mixed with the serum to act as a preservative. It is now believed that the carbolic acid, acting as a germicide, may have attenuated or partially destroyed the virus to such an extent that what have previously been considered safe tests failed to establish the presence of the infection. It is also possible that the virus instead of being disseminated throughout the entire mass of serum, may have become agglutinated. This has been known to occur with germs of other diseases. The result would be the formation in the serum fluid of isolated clumps of foot-and-mouth disease virus, while the bulk of the serum remained free from these tiny masses. If this were the case, it is obvious that certain animals inoculated with the serum would develop foot-and-mouth disease and others would escape. Up to the present, it should be stated, scientists have not been able to identify the germ of foot-and-mouth disease although the economic importance of the plague in Europe has caused it to be studied exhaustively for many years.

In the Department, experiments are now being vigorously prosecuted with a view to discover a means of treating serum at the time of its manufacture which effectually will kill the virus of foot-and-mouth disease. The results so far attained are promising and the Department hopes that a successful method will be evolved shortly. In the meantime all the infected serum in the hands of the Chicago

Serum Company has been destroyed without compensation. All other serum manufactured in Chicago, which it was believed might contain possibilities of danger, has likewise been destroyed. Furthermore, the Department is prohibiting the shipment of any serum from licensed establishments in the districts that are under quarantine for foot-and-mouth disease.

The problem of producing serum which will be effective in controlling hog cholera and at the same time will be absolutely safe in general use is complicated by the fact that the Department of Agriculture has no authority over the serum plants which dispose of their products exclusively in the state in which they are manufactured. Such establishments are amenable alone to state law and regulation. The virus act confers no authority on the Department to guarantee or certify any commercial serum, nor does it provide for a continuous examination and inspection of serum establishments, such as the meat-inspection law provides for packing houses. The Department can only control serums and analogous products in interstate commerce when there is evidence that they are contaminated, dangerous or worthless, or when the manufacturer is not licensed to engage in such interstate business. The virus act was passed about two years ago, and within the short time intervening between its passage and the outbreak in 1914, and with the facilities available, the Department extended its inspection over serum plants just as far as the law and circumstances permitted. There were in October, 1914, about ninety serum plants holding Federal licenses, located at widely separated points in the United States. This condition rendered continuous inspection very expensive and impossible with funds legally available for the purpose.

The thirty-third annual meeting of the Illinois State Veterinary Medical Association is announced for December 2, 3 and 4, at the Lexington Hotel, Chicago. An interesting and important program has been prepared.

According to newspaper reports the hog cholera situation in Indiana is as bad or worse than it has been in recent years.

A Keokuk paper states that an Illinois veterinarian is stationed at the east approach of the Keokuk-Hamilton bridge and sterilizes and disinfects, without charge, all animals coming from the Illinois side. This will facilitate traffic with horse and mule-drawn vehicles.

In response to numerous inquiries from residents of Wyoming, State Veterinarian French has written a bulletin on Influenza and Strangles.

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PIERRE A. FISH, Editor

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THE NEXT MEETING OF THE A. V. M. A. TO BE HELD AT DETROIT

At a meeting of the executive committee at Chicago, December 1, it was voted to hold the next regular meeting of the American Veterinary Medical Association at Detroit, Michigan, with the week beginning August 21, 1916. The location is about in the center of the veterinary population, when Canada is considered, and a large attendance should be insured. It is none too early to make plans to attend and to interest your fellow practitioners, who are eligible to become members, to join in making this a record-breaking meeting for attendance.

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THE VROOMAN CONFERENCE

The chairman's address was an eloquent, careful statement of the objects of the gathering and an intimation that its time would be devoted to those objects alone. On several occasions, on the first day especially, efforts were made to carry the discussion into side tracks, but Mr. Vrooman firmly refused to allow it, and skillfully piloted the convention from reefs and shoals when it might easily have come to grief.

The large and representative attendance included all the men who have been most active in the fight against foot-and-mouth dis-

ease, the chief officers of the Bureau of Animal Industry, State Veterinarians and Live Stock Commissioners, as well as many others vitally interested in its suppression, farmers, railroad men and superintendents of stockyards. The general tone of the convention was of congratulation for what had been accomplished, hope for the future, and of confidence in the Bureau of Animal Industry and its officers. A strong realization of the extent of the peril threatening the live stock industry of the United States was voiced by many speakers, with corresponding gratitude that it had been successfully met and overcome.

There were a few discordant notes from individuals who thought they had reason to criticise methods and officials, and it was evident at times that the State of Illinois had disappointed her neighbors, but on the whole there was manifest a desire to forget and forgive the mistakes that had been made and to trust that they would serve a good end in pointing the way to better methods in the future.

Among the many points of interest was the discussion on quarantine. It came out that a quarantine could not be imposed by federal officers without referring to Washington and waiting for the publication of notice of quarantine in the newspapers. It was thus nearly two days after the discovery of infection in the Chicago Stockyards before they were placed under quarantine. This is obviously so absurd and dangerous that no doubt the necessary steps will be taken to rectify it. It should not take two minutes to quarantine a stockyard from which infected animals are being shipped.

Another matter of great importance is the necessity of providing the necessary funds for compensating owners of herds destroyed. The difficulty, delay and uncertainty of getting these funds has added very much to the trials of the officers engaged in control work and is the cause of appeals to the courts and sometimes of concealment of disease.

Part of this difficulty is inherent in the dual system of state and federal control, but no doubt much can be done to harmonize these authorities, and to provide that necessary funds shall be available when required. Payment of day laborers employed in burying condemned animals, men engaged for disinfection of premises, guards and watchmen, cannot be postponed indefinitely without creating trouble and dissatisfaction. Funds should be instantly available for such purposes, and it appears to be the duty of state legislatures to provide them.

Considering the difficulties to be surmounted, the vastness of the country infected, the inexperience of the men employed in the work, it is a marvellous achievement to have controlled the disease. The veterinarian has proved his value to the country.

F. T.

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THE UNITED STATES LIVE STOCK SANITARY ASSOCIATION MEETING

The nineteenth annual meeting of the United States Live Stock Sanitary Association convened Wednesday morning, December 1st, at LaSalle Hotel, Chicago, with an exceptionally large number present. This was due to the fact that for two days previous a conference called by the Assistant Secretary of Agriculture Vrooman and ably presided over by him, had been in session and was attended by many interested in the Sanitary Association meeting.

After the usual opening ceremonies the business portion of the program proceeded with dispatch and many important papers were given.

The forenoon session was occupied by articles on "Milk and Meat Inspection" by Dr. Robertson of Chicago; "Forage Poisoning" by Dr. Graham of Kentucky; "Compulsory Pasteurization of Milk" by W. B. Barney of Iowa; "Summary of Investigations on Immunization against Anthrax" by Dr. Eichhorn of Washington and "Infectious Pneumonia of Calves Shipped from Public Stock Yards" by Dr. Kinsley of Missouri. All these caused considerable discussion, particularly the milk pasteurization paper which seemed to show that the importance of this question was generally recognized, and the opinion, as expressed, seemed practically unanimous that one of the most common methods of spreading infectious diseases was through the medium of unpasteurized dairy products.

In the afternoon the program opened with papers on the subject of "Hog Cholera" by M. Dorset of Washington, D. C. and C. J. Sihler of Kansas and were discussed by Doctors Stange, Moore, Bennett and others. This subject, as usual, caused prolonged discussion and indicated the necessity of further investigations being carried on before definite conclusions could be reached. An able paper by Dr. Cary of Alabama on "Tick Eradication" followed. An interesting talk on co-operation between State and Federal

Authorities in Controlling Infectious Diseases by Assistant Secretary Vrooman of Washington was listened to with careful attention. This was followed by a moving picture exhibition on Sanitary Farm Equipment by Norman K. Wilson of Pennsylvania.

In the evening the members of the Chicago Live Stock Exchange gave a banquet to the members of the association and visitors at the Stock Yards Inn, which was enjoyed by all.

Thursday morning papers were read by Dr. Eliason of Wisconsin on "Co-operation with the Bureau of Animal Industry in the Control and Eradication of Contagious and Infectious Diseases"; by Dr. Luckey of Missouri on "Livestock Inspection"; by Mr. Davies of Minnesota on "Sanitation in the Transportation of Livestock"; by Dr. Bolser of Indiana on "Disinfection of Stock Yards" and by Dr. Houck of Washington on "Effective Quarantine as a Factor in Controlling Foot-and-Mouth Disease". These were discussed by Doctors Butler, Marshall, Dyson and others and indicated the necessity of careful co-operative work between local state and federal authorities and the importance of proper attention to sanitation and cleaning of cars, stock yards, etc., used in handling livestock. It was made apparent that some latitude should be given in the matter of quarantines and many of the speakers favored more or less elastic restrictions so they could be modified according to circumstances.

The business session Thursday afternoon completed the program. Officers elected for the ensuing year were Doctor O. E. Dyson of Illinois, President; among the Vice-Presidents elected were Doctors Stange, Cary and Howard; Dr. J. J. Ferguson was re-elected Secretary-Treasurer.

The meeting was considered by those present to be one of the most important ever held by the association and the subjects discussed and the conclusions reached cannot fail to have an important bearing on the future livestock activities of the country.

The foot-and-mouth disease epidemic was apparently foremost in the minds of the majority of those in attendance; but it was evident that the events of the past year had brought those interested in livestock sanitation to a better realization of the importance of prevention of animal plagues of all kinds, and the adoption of preventive rather than curative measures to bring about the desired end.

J. G. W.

ANIMAL PROTECTION AND THE VETERINARIAN

In view of the greatly disturbed condition of the world during the past year, the report of the Secretary of Agriculture for 1915 is of more than usual interest, especially as it relates to animal products. The total estimated value of all farm crops and animal products for the year is \$9,873,000,000, which exceeds by \$83,000,000 that of any previous year. The exports of horses and mules increased from \$1,000,000 to \$77,000,000; meats and dairy products from \$146,000,000 to \$220,000,000. Usually the number of horses and mules exported is insignificant. The total number (355,000) exported represents little more than 1 per cent. of the supply in the United States, and was not sufficient to prevent a decline of about 4.6 per cent. in the average price, although the exports of meats and dairy products rose about one-half they did not prevent a decline in prices to producers of cattle and hogs, possibly because of a greater increase in available supplies during the year. This is a rather remarkable showing when the ravages of the foot-and-mouth disease are considered.

Attention is called to the enormous direct losses from the diseases of live stock. Although an accurate statement cannot be given, even of the direct losses, it is known that the indirect losses are also very great and they cannot be estimated at all. However, a conservative estimate, based on data for thirty years, shows that the annual direct losses from animal diseases are approximately \$212,000,000. Some of the larger items indicated in this annual loss are as follows:

Hog Cholera.....	\$75,000,000
Texas Fever and Cattle Ticks....	40,000,000
Tuberculosis	25,000,000
Contagious Abortion.....	20,000,000
Blackleg	6,000,000
Glanders	5,000,000

Other diseases are mentioned which involve smaller items, with a group of unclassified diseases amounting to \$22,000,000.

Surely this state of affairs demonstrates the need of educated and efficient veterinary service. Basing our estimate of approximately 14,000 veterinarians in the United States upon the official census of 1910 and the pro rata increase each year, this would mean that if these losses could be abolished and each veterinarian were

equally active in the work, each one would be entitled to receive, as his share of the proceeds, the sum of \$15,135. The problem is largely educational and involves research. If each state expended annually the sum of \$50,000 for educating and training properly qualified men the total cost would amount to only a trifle over 1 per cent. of the total amount lost each year. There is little question that this expenditure, properly directed, would diminish the losses, and improve the conditions or would, at least, prevent them from getting worse. Such an investment should yield large returns after a period of years. Any business concern suffering a similar percentage of loss might expect to experience some inconvenience in the course of time. Such a relative loss of animals has a bearing on the question of the high cost of living and it would appear that the veterinarian has a duty to perform.

Tick eradication in the South has been carried on with energy. All new ground gained encourages a greater development of the cattle industry. During the year 37,255 square miles have been opened up, so that up to June 30, 1915, 253,163 square miles had been cleared of this pest.

In the hog cholera work, the use of properly prepared serum has had a pronounced effect. A great number of hogs have been saved. The systematic eradication work conducted in certain counties in 16 states shows that 178 hogs in a thousand died from cholera in 1912, 168 in 1913, and only 49 in 1914. Only 62,690 died in these counties in 1914, as compared with approximately 200,000 in each of the two years preceding.

In round numbers there are 200,000,000 cubic centimeters of hog cholera serum produced in the United States. Of this amount about 25 per cent. or approximately 50,000,000 cubic centimeters are prepared by state governments. The federal government produces serum for experimental purposes only. Private establishments of which there are between 90 and 100 therefore manufacture about 150,000,000 cubic centimeters. Of these establishments 81 have secured licenses from the Department of Agriculture and are privileged to carry on an interstate business.

Under the virus-serum-toxin act of 1913 the Department is authorized to promulgate such regulations as may be necessary to prevent the preparation, sale, barter, exchange, or shipment, in interstate commerce, of worthless or contaminated viruses, serum, etc. The Department may revoke licenses after a hearing has been

granted, and federal agents or employees may enter and inspect any licensed plant at any hour. Some violations have been discovered and successfully prosecuted.

Government ownership has been suggested in the matter of the control of serum production. Although some things may be said in favor of the plan, it is doubtful if it would be practical. If the government produces the material it should control the output. At present there are 21 states with established plants and these states may not care to discontinue the work. The purchase of existing establishments and the erection of others by the federal government would necessitate a large outlay and federal manufacture, although administered with honest methods, may not serve as a guarantee that no contaminated or impotent serum would be sold.

As a substitute for government ownership the Secretary suggests that the present inspection service be continued with an adequate force of inspectors: that the law provide for the establishment and maintenance of a "government test station" for serum to receive official samples of all serum produced by licensed plants and to test them for purity and potency: to prohibit the interstate shipment of any product of which a sample had not been tested and found pure and potent: the imposition of a tax upon all serum of which samples have been tested, with provision for affixing tax stamps and marks prior to sale. As now conducted the establishments make the tests themselves. The present method of inspection is effective in seeing that the steps necessary to produce a good article is carried out, but the weak point now is the inspection of the tests and it is this feature the government should control, although the available methods for determining purity and potency are not scientifically exact. It is suggested that the tax for the tests should be sufficient to maintain the station without increasing the cost to the farmer since the manufacturers would be relieved of making their own tests. There may be a question as to whether the plan will operate as suggested, for it is usually the rule that the consumer pays the tax ultimately. The cost to the government in carrying out such a plan would undoubtedly be much less than under "government ownership."

The foot-and-mouth disease, which we trust has reached the vanishing point, is referred to in some detail. The especially mild and obscure form of the 1914 outbreak at its outset and the diffi-

culty of diagnosis is frankly stated. The exact origin has not yet been discovered, although it is believed the infection was introduced from a foreign country. The methods and progress of eradication are described. At one period new cases of the disease were found more rapidly than the old ones could be disposed of. After some months of vigorous work, the outbreak was brought under control and the spread of the disease checked.

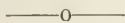
One of the most complicated problems of the outbreak was the herd of pure-bred cattle at the National Dairy Show. It is stated that the manager of the show was warned by an inspector of the Bureau of the danger of holding the show because of the recent discovery of foot-and-mouth disease. At the close of the show, the herd was detained to determine whether they had become infected or not. One of the cows soon developed the disease and the herd was placed in close quarantine. Considerable bitterness developed over this herd and others where valuable animals were involved, particularly in the matter of appraisements and quarantine. It was emphasized that the breeding value should be considered as well as beef and dairy value. Congress, however, in making appropriations specifically provided that the beef or dairy value only should be the basis of appraisal, as was the case in former outbreaks. The department was therefore obliged to keep within the law. In case of further outbreaks the Secretary recommends that the breeding value be taken into account for reasons of equity and practical expediency, but that this value shall not exceed three times the beef or dairy value. On this limit there will doubtless be much opposition among the breeders.

A recurrence of the disease occurred last August as a result of the use of contaminated hog cholera serum. This serum had been tested before its use and appeared to be pure but subsequent and repeated tests demonstrated that it was contaminated. The limitations of ordinary knowledge and ordinary precautionary measures have been exposed and the necessity for preparedness for extraordinary conditions has been emphasized.

For more than a year the veterinarians have been embattled, in trench warfare, with an enemy of the most insidious character. There have been many anxious moments; there have been temporary defeats; now victory is in sight, but there can be no peace until the enemy is annihilated. The experience has chastened many; but out of it all some lessons for good must come; some advanced

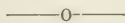
knowledge gained of the enemy's strategy, which will strengthen our methods of preparedness for future and unannounced attacks.

P. A. F.



REORGANIZATION COMMITTEE

A portion of this committee met December 1, at the Hotel LaSalle in Chicago and in a tentative way discussed some of the problems that lie before it. The sentiment of those present was decidedly in favor of receiving suggestions from members of the association who are interested in the matter. Such suggestions will be welcomed by the chairman of the committee, Dr. C. A. Cary, Auburn, Alabama.



EUROPEAN CHRONICLES

Bois Jerome.

For a long time to come, regrets will prevail in the veterinary profession all over the world that the last Veterinary Congress could not be held. The preparation of the various committees had been so perfect, the number of valuable papers and reports that were promised, the gathering of veterinarians from all over the world, the occasion for celebrating the name of the great veterinarian, JOHN GAMGEE, who had inaugurated these congresses; everything in fact had justified the expectation for an unusually grand success.

All that has been useless. The congress was not held. Was all the work that was done, were all the reports, the papers, the communications that were promised and looked for, to be all lost?

Fortunately, No. Several have already found their way in some of our professional journals and the *Review* has made allusions to some of them, as these reached our offices. To day it is our pleasure to notice two that have found their way in the French and English journals.

In the first, the *Recueil*, we read the valuable report of Professor G. MORSSU of Alfort, which was presented to the Congress.

It is on EPIZOOTIC ABORTION. One of the diseases which is most ruinous to French stock raising and whose effects though less apparent than those of foot-and-mouth disease, tuberculosis, paratuberculous enteritis, anthrax fever, etc., are extremely severe be-

cause of the diminution in the animals, in the loss of young ones, the reduction in the milk production as well as the many complications that may accompany its presence.

EPIZOOTIC ABORTION is not a disease of bovine species alone, it also effects horses, and probably animals of the ovine, caprine and swine species. That of bovines is the object of the report.

The one presented by Prof. Moussu is long and will not permit in the space allowed for this chronicle to be presented in whole, but the subject is so important and of so great interest for some of our readers that I must consider it as thoroughly as I can.

The learned professor has treated his subject in a peculiar manner, dividing it in some ten chapters, some of which are more or less in the shape of questions and it is the resumé of these chapters that I gather for our friends in America.

1—METHOD OF ABORTION DURING GESTATION—EARLY, ORDINARY, LATE ABORTION. The indisputable fact, classically speaking, is that abortion takes place between the 4th and 5th month of pregnancy. Yet, cases of abortion are observed at any date during gestation, in the 1st, 2d or 3d month, and again as near as the day of delivery.

As long as epizootic abortion may take place at any time of gestation, it may be called EARLY or PRECOCIOUS, ORDINARY or LATE. If the first is overlooked, it is because the products are not detected by those who have care of the animals, and if they are noticed they are not considered as important as those of later date, four or five months. This is an error, and is another danger, as no precaution is taken from any point of view.

2—INFLUENCE OF THE REGIME AND TIME OF THE YEAR. Abortions can be observed at any time of the year but are more numerous at the time of stabling than in the pasturing season. In the first the chances of contagion are greater and more numerous.

A peculiar observation remains, however, without satisfactory explanation. An enzooty breaks out in a stable. For one, two or more months or more, successive abortions are observed, sometimes without a single normal accouchement. Then at a given time, there seems to be a stop, normal deliveries follow and abortions disappear or are very exceptional. All this takes place, without any care having been taken to stop the epizooty. Why? And why in some localities or rural areas has abortion made ravages for thirty years or more no matter what precautions have been taken; and in others

the disease made only a short appearance and disappeared without any preventive or curative measures having been taken?

3—THE FETUS AND ITS ENVELOPES. In infectious abortion, the fetus has not the same characters as in accidental, traumatic or other abortions. The alterations, especially those of the placenta permit a clinical diagnosis, that of infectious or epizootic abortion.

By direct examination, one easily observes that among the placental tufts, there are some which are healthy and have their red or uniform dark red aspect of the placenta of normal delivery. But there are others, on the contrary, which appear yellowish red or dirty yellow, and which are evidently diseased.

The extent of these alterations varies. But in most cases they show two different types; sometimes the diseased vascular tufts are grouped along with the others and occupy more often the region of the body of the uterus and the posterior part of the gravid uterine horn, while the healthy tufts are grouped towards or at the bottom of the gravid and the non-gravid uterine horn.

In other cases, the distribution of the healthy and diseased tufts is more irregular; there are healthy tufts from the body of the uterus to the bottom of the gravid horn and also diseased ones with a similar disposition.

Moussu believes that this depends on the mode of infection. In the first case, it is due to ascending external infection by the direct genital way and in the second to descending infection of hematogenous origin.

4—THE CONDITION OF THE FETUS. This can be classified in three groups.

1. Those where there exists cadaveric decomposition and beginning putrefaction, due to other infections, added to that which has produced abortion, which are most often of external origin, and sometimes of internal hematogenous origin. The fetus cannot be used for useful researches.

2. Those where no external apparent alterations can be observed, but in which post mortem reveals sero-hemorrhagic exudations in the splanchnic cavities. They are always infected. The blood, tissues, viscera and digestive contents ordinarily give cultures, where the abortive bacillus and coli or paracoli can be found.

3. Those where there are no visible alterations. These are most useful for research.

Cultures with the blood or stomach contents may be negative

but again be positive with the blood and contents from the digestive tract, together or simply with one or the other of these products.

5—MODE OF ACTION OF THE CAUSES OF ABORTION. The complicated and varied alterations being well known, the causes of abortion can be explained as follows:

When the lesions are predominating on the envelopes, gestation can go on to term or near it, if the surface of the intact placenta is still large enough to keep up between the mother and the fetus sufficient nutritive exchange for the life of the new individual. The new born at term and those prematured near term remain viable, if they are not infected, although out of mothers affected with epizootic abortion or of abortion infection. Such cases are not frequent, but yet not exceptional.

When, on the contrary, the surfaces of the intact placenta is too reduced to keep up between the mother and the fetus sufficient nutritive exchange for life, the little one dies at any period of gestation, although not infected and is expelled shortly after, dead or alive, but not viable.

In another form of evolution of the accidents, the fetal fluid becomes infected with the specific agents of the disease, and the fetus also, by the digestive tract through the amniotic fluid or by way of the blood through the placental circulation. If this takes place near term or delivery, the fetus is born alive or viable but dies shortly after birth. If on the contrary, this takes place some time before term, the fetus dies, is expelled shortly after and not altered in appearance.

Finally, when on the evolution of the specific placental lesions, an accidental genital infection develops as a secondary affection, the progress of the process is accelerated, the fetus dies quickly and is expelled, more or less altered, sometimes in a state of putrefaction.

6—CAUSES OF EPIZOOTIC ABORTION. It is admitted by nearly all, that the principal cause of epizootic or infectious abortion in cows is due to the action of the bacillus of *Bang*. *Is it the only cause?*

Professor Moussu says: "In my opinion, *No!* The abortive bacillus of Bang, can alone, promote abortion, slow to appear: that is a fact definitely demonstrated. In a number of cases, I have the conviction that it is associated with coli or paracoli, which produce more rapid abortion and I am convinced that many infectious abortions are functionally of a special variety of paracoli."

In various enzootics of abortion, Moussu has recognized the

presence of a specific variety of paracoli, exclusive of the bacillus of Bang and with cultures he has been able to produce at will, rapid abortion, in all the subjects of the experiments; Guinea pigs, does, goats and ewes.

7—MECHANISM OF THE INFECTION. For a long time, it has been thought that infection was exclusively taking place by the ascending genital tract, the organic alterations being limited to the uterus, and undisputable proofs being furnished by experimentation. Whether the genital infection takes place by the bull or whether it may be by external genital contamination and become ascending, is not important. This contamination is so easy that it seems natural that ascending infection can take place and progress.

But experimentation has also given proofs, no less positive, of the possible infection through the digestive tract and secondary through the circulation. These were proved by the investigations of the English Commission, which have shown that the pathogenic agent or agents of the disease can be brought to the placenta as a sequela of the soiled condition of solid or liquid food.

These facts can be controlled by everyone and Moussu has obtained them with the bacillus that he isolated. But leaving aside the contamination by the bull and admitting infection taking place during gestation, Moussu believes that the infection takes place most often by the genital tract during stabling, and that in abortion in pastures, it is the digestive apparatus, which acts principally in the spreading of the disease.

All this is of interest from the prophylactic point of view. Moussu believes that in early abortion, contamination occurs principally through the bull, unless a latent pre-existing genital infection of the female is present: that in ordinary or late abortion, contamination takes place by external genital introduction of the germ and that in ordinary or late abortion in pastures, the infection must be caused principally through the digestive tract, the food or the drink.

8—EXPERIMENTAL ABORTION. The experimental reproduction of abortion by intra-vaginal infection of a pregnant cow or by ingestion with cultures of Bang's bacillus is an admitted fact.

Attempts of the same kind were made by Prof. Moussu with the paracoli which he had found in various enzooties and he has obtained many positive results in most of the females that he inoculated. After giving the results that he had observed, the positive

as well as the negative, he came to the conclusion that it is very certain that the abortion bacillus of Bang is not the only agent that can produce epizootic abortion in cows.

9—DIAGNOSIS OF INFECTIOUS ABORTION. One of the most important and certainly most practically useful question in infectious abortion of cows is the possibility of precise diagnosis of future abortion or better of the abortive infection during gestation.

Today we have no means of quick, practical and sure investigations. A close observer may have some good points which may make it suspected. But if these are sufficient for the application of some prophylactic measures, they are not enough. A threatening abortion has not the value of the diagnosis of one likely to take place at a later period.

The *Abortine* of the English Commission has given only unsatisfactory results. The methods of agglutination, of the derivation of the complement, have done no better. The experiments made with *Abortine* by Moussu and which he studied especially and tried with subcutaneous and intra-dermal injections, have given him results without any significance.

In résumé, we have not at present any positive and practical means to diagnose abortive infection or its severity.

10—TREATMENT. Today we cannot fight against epizootic abortion with any efficiency. The treatment recommended as efficacious may have shown good results because of fortunate coincidences and, while successful in some outbreaks, failed in others.

The problem of the infection is too complex. Its nature and causes are too numerous to be solved in the present state of our knowledge.

Prophylaxis is for the present the measure that gives certain results, for instance, the strict isolation of cows about to abort, the disinfection of the barns, of the genitals of aborted animals, etc., etc.

But the true solution will be the application of a preventive vaccination or a specific treatment practical and sure. Trials of vaccine have been made in Europe and America. Moussu has also tried it but it is to be hoped that at the Congress the solution will appear from the communications and papers which will be presented.

The *Journal of Comparative Pathology and Therapeutics* has already published several of the reports intended for the London Congress, that of Prof. W. L. Williams on the technic of the Opera-

tion against Roaring, that of Sir John McFadyean on Tuberculosis, that of Director Vallee of Alfort on Immunity Against Tuberculosis and Vaccination Against Tuberculosis in Cattle.

In the September, 1915 number of the Journal, there appears one from an American, Doctor L. A. Merrillat, Professor of Surgery in the McKillip veterinary college of Chicago. The subject is Respiratory Anesthesia of Animals, one with which the author must necessarily be a master, his experience covering "10,000 horses and many small animals."

After paying a just tribute to America in recalling the name of Doctor T. G. Morton who introduced the use of anesthesia in human surgery, and a few remarks on the necessity of general or local anesthesia, on the advantages that a regular anesthetist would prove, if available, or to the student, Doctor Merrillat states that the successful administration of an inhaled anesthetic requires a wealth of experience.

The patients which require general anesthesia are divided into groups. In one, he places those that can be safely anesthetised without any special skill on the part of the anesthetist. Neurotomy, tendonotomy, ablation of small tumors, castration, etc., etc. For such, respiratory anesthesia is always better than local or regional. From 60 to 90 c.c. of chloroform for horses are required for these cases and to obtain a state of surgical anesthesia.

In another group, are found animals more or less enfeebled by disease or those which demand long and bloody operations. Poll-evil, fistula of the withers, septic podotrochilitis, carcinomas, schirrous cord, large tumors, etc. The real anesthetist is then required.

A few words are then given in relation to the rate of deaths likely to be recorded and related that of an anesthetist who out of 45,000 patients had never had a single death to record from anesthesia.

Dr. Merrillat then gives at some length the description of the two methods for administering respiratory anesthetics for serious operations and which have proved the safest in his hands.

First Method—The animal to be submitted to serious operation must be in as healthy and good condition as possible, as far as grooming, feeding, cleaning, etc. is concerned. His bowels are prepared by diet and his stomach cleared of food.

Chloroform is too toxic to be administered alone, hence Merrillat resorts to (1) a preliminary anesthetic, (2) then the anesthetic proper and (3) the terminal anesthetic.

Chloral hydrate is given *per os*, 30 to 40 grams in a drench of hot water an hour before the operation. It is the preliminary anesthesia.

For the anesthetic proper, chloroform is used with a sponge and a canvas cylinder, 18 inches long. This is closed at both ends with a tobacco-pouch string. One end is drawn over the nose and secured to the halter. At the other end, the sponge containing the chloroform, is placed against the nostrils, 30 grams being used first and 30 more later if anesthesia is not obtained.

The free end of the cylinder is held shut with the tobacco-string or the hands. When the reflexes are manifestly under control, the terminal anesthetic is administered.

It is composed of equal parts of alcohol, chloroform and ether. This is given through a towel laid over the nostrils, the parts being well soaked with the mixture. Air is allowed to pass freely through the undermost nostril.

In some cases pure chloroform may from time to time be dropped on the towel instead of the mixture.

For small animals the same general plan is used. But chloroform demands greater care and attention. Ether is better and safer for small animals and should be chosen by the inexperienced anesthetist.

Second Method—This, Merillat recommends to be used with great caution, when resorted to for serious operations.

It is the intratracheal method. The preliminary anesthesia of chloral is given, followed by the anesthetic proper and the terminal into the trachea with an atomizer.

The tube of this atomizer is attached to a foot-bellows, the bottle containing the anesthetic is placed in a small box containing an electric light to raise the temperature of the liquid and the delivery tube is placed into the trachea through the upper nostril.

Splendid success has been obtained in this new method of respiratory anesthesia.

The following are the conclusions of this interesting communication:

1—For slight anesthesia suitable for short operations, the respiratory method is safe in the hands of even an untrained anesthetist.

2—For the profound anesthesia, required for serious and long operations, respiratory anesthesia is safe only in the hands of an expert.

3—The most discouraging part of respiratory anesthesia for animals is the difficulty of regulating the dosage. We need an apparatus to measure automatically the vapor delivered and consumed by the patient.

4—For profound anesthesia of considerable duration the best way to keep within the limits of safety, is by administering a preliminary anesthetic of chloral, followed by chloroform and then maintain the narcosis with a terminal anesthetic of alcohol, chloroform and ether.

5—Despite profound anesthesia, exhaustion of the brain follows serious operations. This may be prevented by blocking with cocaine, the nerve trunk which leads from the seat of operation.

6—The intratracheal method of respiratory anesthetics is worthy of trial. It is a step in the direction of dose regulation suitable for animals.

7—The intravenous method of ether and chloroform is unsafe with the apparatus that we have at present for its administration.

A. L.

CORRECTIONS: In the November number on page 184, in the fourth line from the bottom the name of Dr. Marshall should be substituted for that of Dr. Jones and the name of Dr. Jensen for that of Dr. Marshall.

On page 315, in the article on Hexamethylenamin in the December number, the word curative should be substituted for laxative in the tenth line from the top of the page.

In the October number of the JOURNAL Dr. W. H. Robinson of Portland, Maine was listed as a visitor at the Oakland meeting of the A. V. M. A. when he should have been classed as a delegate. Since his return to Maine, Dr. Robinson has been appointed to the State Board of Veterinary Examiners.

FOOT-AND-MOUTH DISEASE WITH SPECIAL REFERENCE TO THE OUTBREAK OF 1914-1915

(Continued from page 285)

METHODS OF ERADICATION

That this disease must be controlled admits of no argument; therefore differences of opinion hinge solely upon the method or methods to be adopted.

The methods of eradication applicable to foot-and-mouth disease include: (1) Immunization; (2) Quarantine and Disinfection; (3) Slaughter and Disinfection. Each will be discussed separately in the order named.

(1) IMMUNIZATION. Immunization in the present outbreak was out of the question as the only serum thus far produced gives but a passing immunity of only several weeks duration, unstable at best, and impossible to obtain in this country or in sufficient quantities in any country. To Professor Loeffler more than to any other we owe our present knowledge relative to the effects of serum immunization for foot-and-mouth disease. Ever since he was placed in charge of the laboratories for the investigation of foot-and-mouth disease, the Bureau has carefully followed his work. His publications on the subject, and particularly those referring to immunization against the disease, have appeared at various intervals and have been the subject of discussion at several international veterinary congresses. While his work on the serum treatment of this disease is of great scientific interest its practical value has not yet been proved. In the last annual veterinary report of the Prussian Government (1914) a detailed description is given of a series of experiments which were undertaken to establish the value of the serum prepared by Professor Loeffler's method in his own laboratories. These experiments proved that the serum does not protect animals in small doses (20-30 cubic centimeters) but large doses with repeated injections afforded a protection to the animals and might be employed to an advantage in the eradication work when control of the disease by quarantine measures is attempted. In the partly successful experiments, animals over three months old received four injections of serum at intervals of ten to fourteen days. The first injection consisted of 200 cc., and the subsequent injections of 60, 30 and 30 cc., respectively. Considering that the prep-

aration of a liter (about a quart) of serum costs \$25.00 in Germany, it would cost over \$8.00 to protect every animal over three months old, provided the hogs used for the preparation of the virus are passed for food as is the case in Germany; otherwise, the cost of the serum would be at least doubled. It should also be considered that even in these experiments 6 to 8 per cent of failures occurred, and it must be recognized that in a country like the United States with so many highly susceptible animals a single failure of protection might prove to be the source of a new outbreak.

The impracticability of the serum immunization is further augmented by the difficulty of preparing the serum, and particularly on account of this disadvantage the method could not be utilized satisfactorily in countries where the disease is not prevalent or where it occurs only as a result of its periodical introduction. Moreover, the immunity furnished is of quite short duration, lasting only from two to three weeks.

The preparation of the serum requires a propagation of the foot-and-mouth disease virus and its presence in this country would be a constant menace to the stock industry, even with the exercise of the greatest precaution and care. This has been substantiated in Germany where the government was called upon to pay damages for losses from outbreaks resulting from the escape of the virus from Professor Loeffler's laboratories.

The live stock conditions prevailing in this country would also make the serum immunization extremely difficult, if not impossible. The shipment of stock over long distances, particularly the shipments radiating in all directions from stock centers, would necessitate the protection of a large percentage of the stock in the country, or at least in an extensive area. This, with Loeffler's method of serum production, would be impossible.

Protective serum can not be kept for a period of years as it deteriorates and therefore the preparation of such serum could only be considered at the time of the appearance of an outbreak. Considering the great amount of serum required for the immunization of a single animal, it is almost incomprehensible how a sufficient amount of serum could be produced to protect the stock even in a single state. It should be borne in mind that the vesicular contents of hogs affected with foot-and-mouth disease is used for the hyperimmunization of cattle. One or more injections of 100 cc. of such vesicular fluid are made into each of the cattle which produce the

protective serum. The average amount of vesicular fluid obtained from a sick hog is about 5 cc.; thus for each injection it is required to have about twenty hogs affected with foot-and-mouth disease. This fact alone clearly suggests the impracticability of Professor Loeffler's method.

Professor Mettam, in his report on foot-and-mouth disease for the Tenth International Congress at London, 1914, discussing the value of the serum treatment, said: "It must be admitted that serum therapy, as far as foot-and-mouth disease is concerned, is not upon a satisfactory basis. The amount of serum required is large and is costly; its action, as with other sera, is of short duration. It can only give protection for a few weeks at the most, and it may fail in its effects, because either the passive immunity established is of low degree or because the virulence of foot-and-mouth disease virus is variable." * * * * "the time has not yet arrived when we can accurately appraise the value of serum as a preventive against foot-and-mouth disease."

Leclainche at the same Congress stated "Up to the present attempts to immunize animals against foot-and-mouth disease have not yielded any results capable of practical application. Effectiveness does not appear to be capable of accomplishment and serum therapy has not rendered the service expected of it. Experiments carried out in France, in which repeated injections of 40 to 50 cc. of serum were administered, show that these doses only exceptionally confer any immunity. The use of large doses is hindered by considerable practical difficulties and it would be too expensive. Besides the conditions under which serum is obtained are such that its properties are very inconstant. It is impossible to standardize it before use and the effects of the treatment cannot be depended upon. Serum immunization, therefore, has only an insignificant prophylactic value."

"Further investigations in this connection are an urgent necessity" was the conclusion of Nevermann, Germany's highest veterinary official, at London, in 1914.

In Hoare's *System of Veterinary Medicine*, Volume 1, 1913, under the heading of Protective Inoculation appears the following: "Various serums have been tried by the continental authorities but it can not be said that such have proved of practical utility."

The English translation of Huttyra and Marek, Volume 1, page 151, states "The problem of general immunization is not solved at the present time", in referring to foot-and-mouth disease.

Not until a more practical method of immunization has been discovered will it be possible to utilize it for the successful eradication of foot-and-mouth disease in the United States or any other country.

(2) QUARANTINE AND DISINFECTION. It has long been maintained that the method of quarantine without slaughter is a possible means of eradication but one which by its very nature admits of a greater spread of infection. As will be shown elsewhere in this paper foot-and-mouth disease has been combated by quarantine and disinfection in certain European countries for many years. The constant recurrence and widespread dissemination of the infection in these countries prove conclusively that these measures have been unsuccessful. The necessity for an absolute quarantine in a disease so easily transmitted is apparent and this has been found impossible, even in Germany where military support is given to the best organized veterinary police system in the world. Indeed every European country which now has the disease hopelessly fastened upon it has permitted the conditions to exist through this very system of attempted eradication. As a result the infection has become so widely distributed in many of these countries that the authorities are forced to accept this measure of control as the only available and economic method under the present conditions. The infective agent may be spread so readily that it is difficult to prevent its dissemination even where animals are confined in tight sanitary buildings with the most careful use of disinfectants and surrounded by guards, a method entirely impracticable on the average farm and nearly always much more expensive than the value of the average animal so quarantined. Added to these objections is the greater one of known failure in all countries where this method has been tried. In the outbreak of 1902 there were about 100 herds already affected in Massachusetts when the Department began operations for eradicating the disease. Before all these herds were reported or could be reached the animals had recovered and subsequently were not slaughtered but quarantined and the premises disinfected. The difference between the 4712 cattle affected in the 1902 outbreak and the 3872 slaughtered represents chiefly those that made a recovery, although it also includes a few that died of the disease. Some of the owners of the recovered animals visited the Bureau office subsequently and requested that their herds be appraised and destroyed on account of the complications involving the udders and

feet which had developed making the animals unthrifty and unprofitable. Their requests were complied with and after the commencement of the work of eradication no newly affected herds were allowed to be held for recovery. In the 1908 outbreak all herds that became infected were slaughtered, and the same is true of the 1914 outbreak, with the exception of one herd already referred to which was on exhibition at the National Dairy Show in Chicago when the disease broke out among them on November 1. At this time it was the desire of the Department to slaughter the first few animals which contracted the disease and to limit the spread of the infection to others by establishing hospital conditions, separating the herd into small units and segregating these groups by means of partitions and muslin curtains saturated with bichloride of mercury solution and other sanitary methods. While the latter was started and continued for a brief period it was soon abandoned as certain herdsmen, with the approval of the employer, adopted the German method of directly exposing the cattle under their supervision in order that the disease might run its course in all the animals as quickly as possible. In the meantime at the request of a committee of the National Dairy Show Exhibitors Association the Secretary of Agriculture granted permission to the owners to retain their cattle under absolute quarantine until they had fully recovered from the disease and were not disseminators of the virus, which should be determined by experiments to be applied subsequently. Before starting these tests it was the desire to move the cattle further away from the Chicago stock yards and arrangements for the removal of the cattle to the Hawthorne Race Track near Cicero, Illinois, were completed on December 26. An inspection of the animals at that time revealed no cases of foot-and-mouth disease. Only a few cases of various forms of ailments, such as articular rheumatism, pulmonary disturbances and metritis were observed. Five cases of metritis, however, still persisted and these, together with two tuberculin reactors, were destroyed prior to the moving of the cattle. In order to prevent the introduction of virus into the new quarters so far as possible it was decided to spray and scrub the animals with a three per cent cresol solution. They were then taken through a foot bath into a separate stable which had been previously cleaned and disinfected with a six per cent solution of cresol. The animals were then dried with towels, left there all night, and the next morning loaded into special box cars in which they were conveyed di-

rectly to their new quarters at Hawthorne Park. The same care was exercised with regard to the attendants; all their belongings and clothes were disinfected and fumigated, their shoes disinfected and the men themselves required to bathe and change to clean linen. At Hawthorne every precaution was used in unloading in order that no infection would be scattered and the grounds were guarded by deputy sheriffs during the entire period of quarantine.

It is not my purpose to go into details of the quarantine of the Dairy Show Herd, but it should be of interest to record at this time the experiment which proved that the cattle in the Show Herd had fully recovered. Since the publications of Loeffler in 1904 it has been known that certain animals which recover from foot-and-mouth disease may act as carriers of the virus for a considerable period, precisely like persons who act as bacillus carriers for long periods after recovery from typhoid fever, cholera and diphtheria. Such virus carriers therefore must be considered a constant menace to the eradication of the disease when only quarantine measures are adopted. In order to ascertain if any such virus carriers existed among the animals of the National Dairy Show, 50 head of healthy young cattle which had been secured for this purpose were placed in contact with them on March 25. These test animals consisted of 34 steers and 16 heifers, ranging in age from one year to eighteen months. The tests, which were conducted by veterinarians from the Bureau of Animal Industry, included inoculations of the saliva, feces, urine, vaginal discharges and of hoof scrapings, feeding of milk, manure and direct exposure tests. In the exposure tests one susceptible animal was placed between two recovered show cattle and kept there for 48 to 64 hours, then changed and placed between two other recovered animals. This was done until all recovered animals had been given an opportunity to infect the susceptible animals and was repeated three times so that each recovered animal gave 144 hours of exposure to the test animals. At the same time the recovered herd was divided into 48 groups of approximately 15 animals each. From every animal of each group a small quantity of feces was collected, mixed with water, strained, and a cheese cloth saturated with the strained fluid. This cloth was then rubbed into the buccal cavity of the susceptible animals. If in the following seven days no indications of foot-and-mouth disease developed in any of the test animals the same grouping of the show cattle followed for subsequent tests which were undertaken in turn with saliva, urine,

vaginal discharge, milk, and scrapings from the interdigital space and around the coronary band of each recovered animal. During the execution of these tests it was considered advisable to remove only a sufficient quantity of the manure and litter to prevent undue accumulation and to assure satisfactory sanitation, the object being to afford the susceptible animals an opportunity for infection with the virus, if such should be present in the feces. These tests continued until May 9. On April 8, 50 hogs were placed in temporary pens within the enclosure and fed on milk from the show cows and also allowed to consume the leavings and droppings from the cattle.

As a result of these tests no lesions of foot-and-mouth disease were produced, nor were any of the dire results, promised by some apprehensive individuals witnessed, such as the production of tetanus, malignant edema, blackleg, necrosis, pyemia, septicemia, etc. On May 31, three weeks after the last inoculation test and seven months after the show cattle had been placed under quarantine, the latter were released by the Federal Government and permitted to move interstate subject to the regulations of the states at destination. At the beginning of the tests on March 25, 747 animals were included in the number quarantined. On May 30, at the conclusion of the experiment, this number had been increased to 752 by the addition of a number of calves. The conditions under which these show cattle were kept and the sanitary quarters in which they were confined during the period of quarantine would be almost impossible to duplicate under ordinary farm conditions while the great number of animals proportionately reduced the average cost of quarantine. Added to this, conditions permitted the removal of these animals from the infected barn and surroundings at the Union Stock Yards to the clean and sanitary quarters at Hawthorne at a very suitable time. That no virus carriers were demonstrated to exist in this herd is a definitely established fact but this does not prove that such virus carriers would not exist in other herds under like or unlike conditions. It is, however, a source of gratification to this Department, as well as to the public, that conditions allowed these valuable seed animals to be preserved by the methods adopted.

(3) SLAUGHTER AND DISINFECTION. With our present knowledge, slaughter and disinfection is the only satisfactory and economic measure for controlling foot-and-mouth disease in a country like the United States where the infection is not indigenous. All

authorities on the subject agreed on this point in their respective reports to the Tenth International Veterinary Congress at London, September, 1914. Thus we have the report of Professor Mettam, Principal of the Royal Veterinary College of Ireland, who states "Efforts should be promptly made to eradicate the infected centers. The animals affected and those which have been directly and indirectly in contact and which must be considered as probably infected, are slaughtered."

Professor Remmelts of Holland also claims that "Preference must by far be given to the immediate removal of virus by slaughtering diseased and suspected animals than to any other measure."

Leclainche, a representative of the French Government at this congress, likewise advocates the slaughter of diseased and exposed animals in cases where the infection has not become firmly implanted and where natural boundaries are present.

Nevermann, the highest veterinary official of Germany states in his conclusions that "the slaughter of infected herds in Germany has proved an advantageous method of fighting the disease under certain conditions." Earlier in his article he states "With their slaughter, newly appearing outbreaks may be readily controlled and thereby the unpleasant spread from such outbreaks may be avoided. I desire particularly to call attention to the magnificent results of this method attained in England and the United States."

An article by the venerable Professor Guillebau in the Swiss Veterinary Journal, 1915, claims that eradication by slaughter in the lowlands of Switzerland is indicated but not so in the mountains.

Other authorities may be quoted, and the consensus of opinion is that in a locality where it is possible to control the disease by slaughter, this method should be given preference over any other.

In view of these facts and the results achieved in the present and former outbreaks of the disease in the United States, can any one doubt that the measures pursued in this country were not the most suitable for the conditions, especially so if the danger from virus carriers is given due consideration. And it would be desirable for legislative bodies and others to reflect that kind of co-operation that checked and suppressed one of the most infectious animal diseases in the world can be used effectively against other enemies of the livestock industry. Notwithstanding this, certain critics of the Bureau are making similar attacks on the foot-and-mouth eradication work as they did years ago against tuberculosis control work.

Were these criticisms to be heeded, foot-and-mouth disease would unquestionably be saddled on this country to-morrow, as tuberculosis is to-day.

DETAILED MEASURES TO BE ADOPTED

Veterinarians in all branches of the profession should constantly be on the lookout for the disease. Notwithstanding the department has taken every practicable precaution to eradicate the infection and to prevent the introduction of the disease into this country, the infection may recur or again be introduced from abroad. If in the examination of animals any condition may be found that arouses suspicion of foot-and-mouth disease, a careful inspection should be made of the mouth, feet, teats, udder and perineum for specific lesion of the disease. The only specific lesion is the vesicular eruption, but next in order of importance in diagnosing the disease is the erosion, showing abrupt borders which cause it to present a punched out appearance.

The examination should not be confined to the suspicious animals, but should include all susceptible animals of different species on the farm, and if the suspicion of foot-and-mouth disease is strong, the inspection should extend to animals on adjacent farms. The number of animals affected, and a description of the lesions should be noted. Special inquiry should be made into the history of the condition, and all information available should be considered with the view of ascertaining if there is any evidence of contagion.

In all cases even where there is only slight grounds for suspicion of a new outbreak of foot-and-mouth disease the matter should be promptly reported by wire to the chief of the bureau and the state veterinarian and a detailed written report should be forwarded as soon as possible. This report should include a description of the lesions, and their location, the number of susceptible animals of each species on the farm, the number of animals of each species affected, the temperature record, and the history, including the evidence, if any, of contagion. At the same time there should be forwarded to the department, in tightly sealed containers, material immersed in equal parts of glycerine and boiled water for microscopic and inoculation purposes. This material should include the contents of vesicles where available, and where this material is not available, specimens from the freshest erosions or ulcers should be forwarded.

In all instances where a positive diagnosis cannot be made, but where there is suspicion of foot-and-mouth disease, veterinarians should proceed immediately without waiting for a reply to their report to make inoculation tests on hogs or calves, but preferably yearling calves, in order to ascertain whether the disease is transmissible.

It will no doubt be of interest to this association to learn more of the details which have been adopted in the present campaign of foot-and-mouth eradication.

As soon as the diagnosis had been confirmed, the proper state authorities and the Bureau of Animal Industry designated qualified veterinarians to take charge of the work of eradication for their respective governments. These inspectors-in-charge of the eradication of the outbreak promptly requested sufficient supplies and necessary help from the head offices, and co-operated from the beginning in ascertaining the extent of the outbreak, as well as in formulating and enforcing quarantine regulations. The state authorities were requested to quarantine the infected premises immediately, and to place a guard on each of such premises day and night to see that the quarantine was preserved. The owners of the affected herds were fully instructed concerning the nature of the disease and importance of maintaining a strict quarantine. The owners of adjacent farms were similarly notified and instructed in order that they would take precautions to protect their herds against infection. The stock yards in the infected districts were closed immediately and creameries and cheese factories investigated to see that skim milk, butter milk, and whey were being properly sterilized before being returned to farmers; otherwise they also were closed. The widest publicity was given to the outbreaks from the beginning through the daily papers and the distribution of posters, special circulars and similar literature. Public meetings of farmers and stock men from the territory bordering the infected area were called to discuss foot-and-mouth disease, and methods to be employed in eradicating it with particular reference to the duties of livestock owners, and what would be expected of them. Stock owners from infected farms or adjacent premises were discouraged from attending these meetings as all necessary information was carried to them by inspectors making farm to farm inspections. The veterinary inspector in charge of this work requested representatives of state authorities, members of live stock associations and interested livestock owners of the community to speak at these meetings.

Arrangements were made immediately for the transportation of employees and their equipment so there would be no delay when the assistants arrived. As soon as an expert on car tracing arrived a report was secured of all live stock shipments that had been made from the community since the disease appeared. All suspicious shipments were traced to destination and back to the farm where the stock originated in order to ascertain if there was any probability that they were infected when shipped. These precautions were taken to limit the spread of the disease as quickly as possible.

The veterinary inspectors located at various public stock yards were informed immediately by phone or wire of any diseased, suspicious, or exposed animals that were shipped from the infected community to public stock yards. A record was made of all live stock cars that carried infected or exposed animals out of the infected district, and arrangements made with the various railroad companies for the cleaning and disinfecting of such cars before they were again used.

An investigation was made immediately to determine if possible the source of the infection in order to prevent another outbreak from the same source but with negative results. Other veterinary inspectors were detailed immediately to scout in the community wherever rumor or suspicion led in order to locate and quarantine all infected herds as soon as possible. In addition to the scouts, other veterinary inspectors were detailed to make a careful systematic inspection of all live stock within a radius of three miles or more of the infected premises.

In cases where foot-and-mouth disease is reported by one veterinary inspector, the diagnosis should be confirmed by at least one other veterinary inspector. After the diagnosis has been confirmed, the animals should be appraised and arrangements made to dispose of the affected herd as soon as possible to prevent further spread of the disease. The appraisals are usually made by the two appraisers working together, one a representative of the state, the other the representative of the Department of Agriculture. Care should be exercised in selecting appraisers in order to see that only men of proper temperament, good judgment, and who are familiar with the value of different classes of live stock are chosen for this duty. The digging of the trench should be commenced immediately. The owner of the affected herd should if possible, be induced to take the contract to dig the trench. A lay inspector should be detailed to

supervise the digging and should be instructed to remain on the premises until the work is finished. It has been demonstrated during the last outbreak that the smaller trenches can be dug as quickly and more cheaply when picks and shovels are used, as when teams, plows, and scrapers are employed. If the owner of the affected herd refuses to dig the trench a contractor should be hired at an agreed price of so much per cubic yard. In all instances the dimensions of the trench should be specified in writing and the contractor notified that settlement will be made on this basis. If the herd is small and the animals are docile the ends and sides of the trench should be perpendicular. If the herd is large time can be saved by sloping one or both ends of the trench so the animals can be driven into it and there slaughtered. In digging trenches of this kind, they should be seven feet deep, seven feet wide, and long enough to allow comfortable standing room for the cattle. Usually there is room in the trench of this size for the additional small number of hogs and sheep found on the average farm, allowing two hogs or sheep for each cow. Where there is an unusual number of hogs or sheep in proportion to the number of cattle additional space should be provided in specifying the length of the trench.

The method of slaughter consists of shooting the animals while they are standing on the fresh dirt at the side of the trench and then rolling them into it, or driving them into the trench and shooting them there. The latter method of handling the animals is preferable in disposing of large herds as considerable time and expense is saved and the surrounding ground is not contaminated with infection from escaping blood, saliva, etc.

The hides of all carcasses should be thoroughly slashed, and the abdominal cavity opened to allow the escape of the viscera. This work should be done after the carcasses have been deposited in the trench. After the hides have been slashed and the abdominal cavity opened, the carcasses should be covered with freshly slacked lime. A barrel of lime to every eight cattle, or fifteen sheep, or hogs of the varying sizes usually found on farms, is considered sufficient. If the animals are large an additional proportion of lime should be used. Since the carcasses are to be buried under a good depth of earth a great deal of lime is not considered necessary. The trench should be filled immediately after the affected animals are slaughtered and a representative of the department or state should be detailed to remain on the premises to supervise this work, and to supervise the

disinfection of the implements and clothing of all men when the work is finished; before they are permitted to leave the premises.

No more men than necessary should be kept from other work to do the slaughtering. One inspector in charge and three lay inspectors, as assistants, are sufficient to constitute a slaughtering crew. The owner of the affected herd is expected to furnish additional assistance if it is required. During the last outbreak of the disease four killing crews of this size have disposed of as many as twenty-eight herds in one day. A rifle of .25-20 caliber or some similar gun is a very satisfactory weapon for dispatching the animals.

After the herd is slaughtered and buried, the infected premises should be cleaned and disinfected without delay. A disinfecting crew consisting of an inspector in charge, a lay inspector assistant, and from seven to nine laborers, has been found most satisfactory, efficient and economical. The lay inspector assistant should be competent to take charge of the crew during the absence of the inspector in charge.

The inspector in charge of the disinfecting crew, his assistant and the two nozzle men should be supplied with a complete rubber outfit, consisting of coat, boots, hat and gloves. Overalls and jumpers should be provided for the remainder of the crew. These outer garments should be removed at the end of each day's work, and left on the premises and before moving to another farm or other premises they should be thoroughly fumigated. In order to hasten the work of the cleaning and disinfecting of infected premises, the inspector in charge of the disinfecting work should precede his crew with a view of planning the work in advance and inducing the owners to haul out the manure and clean the barns and other out-buildings preparatory to disinfection.

The usual supplies used in combating an outbreak of foot-and-mouth disease are dress-suit-cases, rubber goods, such as boots, coats, hats, gloves, fumigating capes, also sponges, permanganate of potassium, formaldehyde, bichloride of mercury tablets, compound cresol solution, chloride of lime and pumps. For each pump there should be ordered 100 feet of 3-ply steam hose and attachments, two spraying nozzles, and an extra supply of leather valves. Implements such as, shovels, forks, hoes, serapers, picks, crowbars, and axes, etc., used in connection with the cleaning of the premises before disinfection must also be procured.

The equipment should also include containers for carrying enough disinfectants for the day's work. Milk cans for liquid disinfectants and a tight sugar barrel for chloride of lime have been found satisfactory. On arriving at infected premises the inspector in charge of the crew should first make an inspection to ascertain whether it is necessary to destroy any property in order to get rid of the infection. Only such property should be destroyed as is necessary to rid the premises of infection.

A record should be made of all property destroyed, giving the measurements, kind, and quality. The owner or his representative should be requested to be present when the measurements are taken or other records made of property destroyed, and before leaving the premises the inspector and owner should jointly sign the report of property destroyed. This precaution should be taken in order to avoid subsequent controversy in adjusting claims.

On receipt of reports of property destroyed the inspector in charge of the station should inform himself regarding the prices of hay, straw, lumber, etc., in the community where such property was destroyed and in settling claims, allow prices accordingly, making fair allowance for waste in replacing lumber and for hardware, etc.

Floors, mangers, stanchions, etc., should not be torn out and destroyed if it is possible to disinfect them effectually for less than it would cost to tear them out and replace them. In disinfecting barns, stables, etc., the condition of the lumber of which the floors, mangers, partitions, etc., are constructed, the time they have been exposed and the opportunity for infection should be taken into consideration, and it should also be borne in mind that if the virus of foot-and-mouth disease can be reached by disinfectants it can be killed without destroying the lumber or other material that harbors it.

Those portions of hay mows, hay stacks, and straw stacks that are infected from animals feeding from the sides or trampling upon such forage, should be removed by cutting or otherwise and the remaining surfaces raked after which they should be sprayed with a 4% formaldehyde solution. The hay and straw removed from the infected stacks should be burned. The owner should be induced if possible to haul out and spread all the manure from the stables and from around the buildings after it has been properly disinfected. This manure should be spread in fields not accessible to animals

susceptible to foot-and-mouth disease, preferably on fields to be plowed. If the weather conditions are unfavorable for spreading manure, it may either be hauled or piled, or sprayed with a disinfectant, the surface forked over from a depth of 6 to 10 inches, sprayed again, and left until the weather is favorable for its removal. Manure that is hauled out and piled should be covered with freshly slacked lime or a chloride of lime solution or a layer of six inches of uncontaminated horse manure, and fenced about with a pig-proof fence. After the removal of the manure the ground upon which it has lain should be limed and left exposed for at least 60 days.

Disinfection can be most successfully and easily accomplished when the buildings have first been thoroughly cleaned. All litter and manure should be removed from the barn floors, entries, feed rooms, and stables. Ceilings or other construction over stables should be swept, dirt and dust removed from sills, mangers, and feed troughs, walls and partitions swept, and the lower parts of partitions removed to facilitate the cleaning and disinfecting of floors. Those portions of posts, stanchions, etc., contaminated by infected saliva should be scraped or scrubbed with a hot solution of sal soda. Manure should be removed from cracks between the floor planking and the badly decayed flooring should be removed and burned. Where floors are in poor condition and have been exposed to the infection for sometime, it is considered advisable to scrub them with a solution of sal soda before applying the regular disinfectants used, or the planks may be taken up and dipped in the disinfectant. It is not necessary to destroy the lumber unless it is badly decayed.

A spray pump is the most satisfactory and effective means of applying disinfectants to large surfaces such as walls, ceilings, manure piles, hay stacks, straw stacks, etc.

Care should be exercised in selecting suitable disinfectants. A solution of formaldehyde is considered most suitable for hay, straw, harness, blankets, feed bags, lap robes, and finished surfaces of walls, ceilings, etc.

Chloride of lime is very satisfactory for outside disinfection where there is plenty of air; for instance, manure piles, open sheds, stock pens, ground, etc., but the fumes are irritating and deleterious to those who attempt to spray with it in closed buildings. Compound cresol solution or carbolic acid is most suitable in disinfect-

ing stables, feed rooms, entries, etc. Formaldehyde gas is suitable for disinfecting dwellings, clothing, root cellars, milk houses, granaries, feed, etc. Such articles as tie-chains, halters, feed bags, cloth lap robes, harness, fly nets, etc., should be dipped in the compound cresol solution as it is practically impossible to reach all surfaces by spraying.

Dogs and poultry that have had access to infected stables, manure piles, etc., should be dipped in a 2% solution of compound cresol.

At least two and frequently four or five systematic inspections should be made of all live stock in the neighborhood of infected premises. The first inspection should commence as soon as the affected herd is discovered and it should extend for two or three miles in every direction from the infected premises. Not more than fifteen days should intervene between the first and second inspections, and the second inspection should be extended to include all susceptible animals within a radius of five miles of the infected premises.

Each inspector should keep a record in a field book provided for the purpose of all inspections made. This record should show the name of the liveryman who furnished the rig, the price, the name of each owner of animals inspected, number of animals of each species inspected and the condition of the animals when inspected. The veterinary inspector detailed to make the second or subsequent inspections should have with him a record of the previous inspections to guide him.

Inspectors detailed to make farm to farm inspection should each be provided with a dress suit-case, rubber goods including hat, coat, gloves, boots, fumigating cape, thermometer, flash-light, sponge, bichloride tablets, permanganate of potassium and formaldehyde.

Inspectors on reaching the premises where live stock is to be inspected should always put on their rubber outer garments before, or immediately on alighting from their conveyance. They should always thoroughly disinfect their rubber garments before leaving the premises. If foot-and-mouth disease is found or any condition that is suspicious of foot-and-mouth disease, the inspector should in addition to washing his rubber garments, fumigate his clothing with formaldehyde gas before leaving the premises. The greatest care should be exercised to prevent carrying infection from diseased to healthy herds and to avoid criticism on account of apparent carelessness.

Headquarters should be centrally located if possible. If the outbreak extends over a large area the territory should be divided into districts, and a substation established in each district. A competent veterinary inspector should be detailed to take charge in each district. He should be furnished with the necessary assistants and equipment and he should be held responsible for the efficient conduct of the work in his district. At the end of each days work the inspector in charge of each substation should be required to make a report to headquarters by phone, or wire or otherwise, showing:

1. Number of new infected herds discovered.
2. Number of herds slaughtered.
3. Number of herds awaiting slaughter.
4. Number of herds appraised.
5. Number of herds awaiting appraisal.
6. Number of trenches ready.
7. Number of trenches digging.
8. Number of premises disinfected.
9. Number of premises where herds have been slaughtered, and premises are ready for disinfection.

When this knowledge has been collected for his entire district, the inspector-in-charge should forward these facts in a night letter telegram to the Washington officials for their information.

As a matter of interest, the following tables are presented which give the number of herds slaughtered by months, including August, in the work of foot-and-mouth disease eradication, 1914-15, and also the number of animals slaughtered by states up to July 15, 1915, together with fiscal statistics:

October	139 herds
November	1101 herds
December	893 herds
January	186 herds
February	359 herds
March	308 herds
April	32 herds
May	3 herds
June	0 herds
July	6 herds
August*	16 herds

*Up to August 22, 1915

REPORT OF ANIMALS SLAUGHTERED AND STATISTICS ERADICATION OF FOOT-AND-MOUTH DISEASE, 1914-15

To July 15, 1915

STATE	HERDS	OWNERS	PREMISES	CATTLE	SWINE	SHEEP	Goats	Total Number of Animals	TOTAL APPRAISED VALUE	BURIAL EXPENSES	PROPERTY DESTROYED IN DISINFECTING	DATE OF DISCOVERY	DISINFECTION COMPLETED	NO. OF CDS
Connecticut	33	33	32	733	143	0	0	876	\$ 48,366.10	\$ 2,358.46	\$ 1,341.39	Nov. 19	Apr. 11	3
Delaware	12	12	12	152	49	22	0	223	8,067.76	1,325.10	509.50	Nov. 6	Dec. 31	1
Dist. of Col.	3	3	3	48	5	0	0	53	3,207.00	215.00	10.80	Nov. 16	Mar. 23	2
Illinois	768	754	709	24,338	33,434	1,248	22	59,042	1,995,244.48	66,471.19	99,287.60	Nov. 1	Apr. 23	52
Indiana	120	115	106	2,355	3,871	615	0	6,841	178,552.75	4,315.93	1,689.06	Oct. 15	Mar. 22	19
Iowa	48	48	43	1,547	2,334	32	0	3,913	125,277.38	4,359.22	1,329.48	Nov. 5	Mar. 22	9
Kansas	6	9	6	1,217	313	0	0	1,530	78,921.98	1,629.74	103.86	Feb. 5	May 6	4
Kentucky	84	79	73	2,951	918	216	1	4,086	134,260.00	2,362.50	1,191.55	Nov. 9	June 18	11
Maryland	56	56	49	964	1,021	197	0	2,782	64,207.34	3,339.66	6,201.26	Nov. 3	May 15	10
Massachusetts	98	96	94	2,107	5,705	77	11	7,900	230,768.13	8,631.77	8,489.76	Nov. 5	Apr. 22	9
Michigan	272	271	239	2,917	3,493	852	0	7,792	210,175.84	5,381.21	1,517.50	Oct. 15	Mar. 18	16
Montana	32	32	15	1,408	11	237	0	1,656	67,492.70	861.12	77.50	Nov. 7	Jan. 3	3
New Hampshire	3	3	3	78	26	0	0	104	4,959.50	189.95	279.50	Nov. 29	Jan. 28	1
New Jersey	50	49	49	1,314	815	9	8	2,146	123,006.88	952.95	1,570.22	Nov. 9	June 9	8
New York	180	193	163	5,410	489	150	38	6,087	442,308.37	10,076.39	7,360.65	Nov. 4	May 18	20
Ohio	222	221	204	4,019	4,994	3,136	1	12,150	363,100.41	12,744.54	2,657.82	Nov. 3	Apr. 2	39
Pennsylvania	904	858	795	14,989	12,055	369	17	27,430	934,197.61	17,684.88	77,958.40	Nov. 1	Apr. 29	34
Rhode Island	59	58	54	988	375	33	0	1,396	68,950.50	5,164.63	2,418.12	Nov. 7	Mar. 24	3
Virginia	8	8	6	378	470	0	0	848	26,052.60	500.44	896.54	Nov. 12	Mar. 20	3
Washington	1	1	1	102	0	0	0	102	4,050.00	.....	.....	Nov. 16	Nov. 21	1
West Virginia	22	22	14	193	189	114	0	496	12,813.16	458.84	1,308.44	Feb. 26	Apr. 12	3
Wisconsin	40	40	37	1,504	1,764	1,435	1	4,704	119,158.06	6,025.70	3,959.56	Nov. 4	Mar. 21	12
TOTALS	3,021	2,961	2,707	69,742	73,574	8,742	99	152,157	\$5,243,138.55	\$156,049.22	\$220,158.51			

(To be continued)

THE SUCCESS AND FAILURE OF THE TUBERCULIN TEST IN CERTIFIED DAIRIES*

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In the course of several years supervision of six certified dairies in the San Francisco Bay region for the San Francisco County and Alameda County Medical Milk Commissions by members of the Veterinary Division of the University of California, considerable data has been collected which should be of concern to those interested in the tuberculin test.

These dairies offer special advantage for such observations because the herds are constantly under supervision and regulation with respect to tuberculosis and other diseases. The animals have been pastured on ground used only for healthy animals and purchased stock has not been admitted on the premises until it has passed the test.

There is also satisfactory co-operation on the part of the owner in most certified dairies which makes the results more reliable than they would likely be on an equal number of animals from other sources.

The methods of supervision in the certified dairies in this section are as follows:

1. Limiting the purchase of stock to herds where less than 10 per cent. of the animals react to the tuberculin test.
2. Semi-annual tests of all animals, alternating the subcutaneous and intradermal methods of testing.
3. Placing the responsibility for the health of the animals upon one individual. (The monthly veterinary inspections required by the Medical Milk Commission is designed to detect physical cases of tuberculosis as well as other diseases. However, in certified dairies physical cases seldom occur.)

"THE TEN PERCENT RULE." When this work was begun in 1905 Ward and Haring followed the practice, which was then approved in this county, of allowing all purchased animals passing the test to be added to the certified herd. However, it was soon learned here, as elsewhere, that it was not possible to reduce the number of reacting animals in the herds at subsequent tests by such procedure when purchases were regularly being made. This led to the intro-

*Presented at the meeting of the A. V. M. A. Section on Sanitary Science and Police, Oakland, Cal., September, 1915.

duction of what has here been termed the "Ten per cent Rule", the effect of which has been to limit the purchase of animals to smaller herds, as experience has shown that it is very difficult to find large herds of dairy cows in this state that would show less than ten per cent of reactors. It is possible to violate the spirit of the ten per cent rule by purchasing a single cow or a few cows from several owners, but this has not been done where the dairymen purchase the stock from the original owner, as they have become impressed with the value of this rule in lessening the danger of reactions at subsequent tests. Even with the enforcement of the ten per cent rule, which must be regarded as stringent in the purchase of stock, it has been found that of the 82 reacting animals removed from the various dairies during the past year, 65 of them, or 79.2 per cent, have been purchased during the last three years. This result, together with the fact that it is difficult and expensive to locate and buy cows from herds where less than ten per cent of the animals react, has encouraged the dairymen to raise more calves from their own herds. Tuberculosis in calves raised in certified dairies is as follows:

HEALTH OF CALVES RAISED IN CERTIFIED DAIRIES

	No. of Calves raised	No. of these Calves raised on milk from tested cows	No. of these Calves reacting
Dairy No. 1	4	4	0
Dairy No. 2			No report
Dairy No. 3	150	150	1
*Dairy No. 4	200	200	27
Dairy No. 5	20	20	0
Dairy No. 6	60	60	0

Although the number of animals raised is limited to 434 the result is significant.

SEMI-ANNUAL TUBERCULIN TESTS. Alternating Subcutaneous and Intradermal Methods. As every attempt is made to minimize tuberculosis in certified dairies, it is the practice in the San Francisco Bay region to test all animals at six month intervals. The subcutaneous test was used exclusively until the second half of 1914 when the intradermal method of testing was introduced. The following data for each dairy shows the results from the two methods of testing:

*Dairy No. 4 showed 18% of cows in the herd reacting at the time of the first test. The first lot of calves were fed refuse hay from the mangers of the dairy barn.

RESULTS FROM SUBCUTANEOUS AND INTRADERMAL TUBERCULIN TESTS
IN CERTIFIED DAIRIES

DAIRY No. 1

	No. animals tested	No. animals condemned	Percentage condemned
Subcutaneous Test			
<i>June, 1914</i>	132	1	.7
Intradermal Test			
<i>December, 1914</i>	125	7	5.6
Subcutaneous Test			
<i>June, 1915</i>	131	3	2.29

DAIRY No. 2

Subcutaneous Test			
<i>February, 1914</i>	259	12	4.6
Intradermal Test			
<i>September, 1914</i>	279	16	5.7
Subcutaneous Test			
<i>March, 1915</i>	298	10	3.3

DAIRY No. 3

Subcutaneous Test			
<i>January, 1914</i>	315	5	1.5
Intradermal Test			
<i>July, 1914</i>	330	16	4.8
Subcutaneous Test			
<i>January, 1915</i>	350	4	1.1

DAIRY No. 4

Subcutaneous Test			
<i>May, 1914</i>	196	15	7.6
Intradermal Test			
<i>November, 1914</i>	172	9	5.2
Subcutaneous Test			
<i>May, 1915</i>	204	8	3.9

DAIRY No. 5

Intradermal Test			
<i>November, 1913</i>	39	0	0
Subcutaneous Test			
<i>June, 1914</i>	43	1	2.3
Subcutaneous Test			
<i>January, 1915</i>	36	0	0

DAIRY No. 6

Subcutaneous Test			
<i>December, 1913</i>	66	1	1.5
Intradermal Test			
<i>July, 1914</i>	135	7	5.1
Subcutaneous Test			
<i>January, 1915</i>	142	1	.7

A summary of the above is given in the following table:

Animals Tested During First Half of 1914 by Subcutaneous Method

No. animals tested.....	1011
No. animals reacting.....	35
Percentage reacting.....	3.4

Animals Tested during Second Half of 1914 by Intradermal Method

No. animals tested.....	1080
No. animals reacting.....	55
Percentage reacting.....	5.0

Animals Tested during First Half of 1915 by Subcutaneous Method

No. animals tested.....	1161
No. animals reacting.....	26
Percentage reacting.....	2.2

The point of greatest significance from the above data is shown in the summary. To the subcutaneous test of 1914, 35 animals, or 3.4% reacted. The intradermal test, made six months later on the same animals, showed 55, or 5% reacting. As there were more than 1000 animals included in this result, the statement made by Haring and Bell that the intradermal test is somewhat more searching in its diagnosis of incipient cases of tuberculosis in animals than the subcutaneous test would seem to be supported.

RESPONSIBILITY FOR THE HEALTH OF THE HERDS. The Medical Milk Commissioners have insisted that all tests and examinations of animals be conducted by the official veterinarian, or under his direct supervision. The reasons for this procedure are manifold: first, it fixes the responsibility upon one individual; second, it leads to uniformity in technique and interpretation; third, specialization is developed, increasing the accuracy of the work; fourth, the filing of uniform records at a central point for a period of years makes it possible to accumulate data of value which is a guide for the future. Identification cards are preserved for all animals in the various herds and ear tags are recorded, and such details can best be done by the man who is doing such work regularly.

THE FAILURE OF THE TUBERCULIN TEST IN CERTIFIED DAIRIES. During the past year one of the largest certified dairies in the eastern part of the United States has had certification temporarily withdrawn on account of tuberculosis developing among the animals in the herd. The Board of Veterinary Experts (Moore, Klein and

White) appointed by the Milk Commissioners* reported that the most important source of infection in the herd was from animals purchased and added to the herd. They state that "All cows were tested with tuberculin at the time of purchase and only those that passed the test were shipped to the farm. The cows which were purchased were from herds that had been assembled by dealers." During a period of four and one-half months 111 animals were purchased. These animals when tested one year later showed 55 reacting, or 49.5%. There are other conditions which are reported to have contributed to the spread of the infection, but it was the failure of the tuberculin test to detect tuberculosis in purchased stock no doubt that led to the withdrawal of certification at the time. If the ten per cent. rule enforced under our supervision, or some similar restriction on the percentage of reactors allowed in a herd from which stock was purchased, had been followed, we believe that the risk of an occurrence of this kind would have been greatly reduced, except in those cases where unscrupulous methods were used by the person selling the animals. From this incident we must be impressed with the great risk that is taken where there is permitted the wholesale and promiscuous purchase of stock for admission to a healthy herd, subject to the tuberculin test.

Some of the recommendations of Moore, Klein and White in the report, to which I have referred above, deserve mention:

1. That the _____ Dairy Company extend as rapidly as possible the plan which they have recently instituted of raising cows to replenish the herd and that the practice of purchasing cows for the dairy be discontinued as soon as possible.

2. That until sufficient cows can be raised upon the farm extreme care be exercised in purchasing new cows. By "extreme care" we mean that insofar as is possible cows be purchased from herds that are free from tuberculosis, and that the purchase of cows from miscellaneous lots of cattle assembled by dealers be discontinued.

3. That all animals not obtained from tuberculosis-free herds be required to pass a tuberculin test before purchase and that they be segregated from the herd until they have passed a retest, which should be made two or three months after their arrival at the farm, a double dose of tuberculin being used.

*Twenty sixth Report of the Medical Milk Commission of Essex County, N. J.

4. That a test of the entire herd be made regularly at intervals of approximately one year.

These recommendations are in accord with the procedure followed in this region, with two exceptions: first, the ten per cent rule is used in the purchase of stock, rather than the segregation of such animals from the herd and their retesting three months later: and second, *semi-annual* tests of all animals in the herd are made, rather than the annual testing recommended by them. When stock is purchased it is usually because there is an increased demand for milk. It would, therefore, not be expedient in such case to segregate purchased animals for three months before they could be used for certified milk production, and, if this were insisted upon, it would increase the cost in maintaining such herds, which we believe the ten per cent rule avoids.

From our results, we feel that a proper restriction in the number of reacting animals which there may be in a herd from which animals are to be purchased, with semi-annual tests, is as safe as the segregation above mentioned and that it is less burdensome to the dairy owners.

—o—

ABSTRACT OF DISCUSSION.

DR. TORRANCE: I would like to ask Dr. Roadhouse what was the method of disposing of these animals? Were they slaughtered, and if so, were post mortems made to confirm the test or not?

DR. ROADHOUSE: The milk commission made no disposal of these animals but recommended to the owner that they be slaughtered and that the animals be posted where it was possible. Of course, in most cases, the animals were slaughtered at the completion of the test and the lesions sought for. The owners have been satisfied with the results, and now they usually do not ask this. In the regular routine it increases the labor to make post mortems, and post mortem examinations are held only when the owner requests it. The owner is encouraged to sell such stock for beef, but the milk commission has no authority over them as long as they are removed from the premises. Usually they were sold for beef by practically all six dairies, but where the number of reactors is large as in the case where one dairy had 35 animals and 15 reactors among them, by the intradermal test, the owner felt that the loss was too great, and I know this particular man sold these animals to other dairies, which is done, no doubt, in other places. There is nothing to prevent it, at present, in California.

DR. KINSLEY: I would like to ask the Doctor if the premises were disinfected after the first subcutaneous test, before the animals went into the same stalls, to be milked?

DR. ROADHOUSE: It is one of the rules of the milk commission that the stalls and mangers be disinfected at the close of each test. This is carried out under the supervision of the inspection department.

DR. KINSLEY: It is rather hard, it seems to me, to interpret the findings. It is certainly unfortunate that we have not the lesions of these reactors to go with the reports to verify the different tests.

In the state of Missouri, particularly around Kansas City, all cows going out for dairy purposes are tested. Those going to the Kansas side are given the subcutaneous test, and those going to the Missouri side are given the intradermal test. In the last three years for the Missouri side, we have tested some 6000 cattle. For the two years preceding this one, about 4500 head of cows were tested. They have been re-tested twice. The dairies are tested once a year by the intradermal method. Of the 2800 and some odd head tested last year, we got 23 reactors, 22 of which showed distinct lesions when killed under government supervision at our Kansas City packing houses. Of the remainder, something over 2800 went in our dairies and were tested during January, February and March of this year, one of those 2800 reacted, and showed lesions on post mortem examination. It is possible and quite probable that we give the tuberculin test to cattle that have been tested within a week or ten days, and yet our findings, I think, have been remarkable on the re-test when one animal in 2800 reacted under such circumstances.

Now in the year previous out of 2800 head not a single reactor was found the first year; with something like 1300 of the 1800 the second year tested, not a single reactor. Perhaps it is in our lack of efficiency in making the test, but we find that our percentage of reactors is practically the same as the subcutaneous reactors in the same class of animals in the yards.

DR. MCNAIR: I would like to ask Dr. Roadhouse or other gentlemen doing work along this line what in his judgment is the value of auscultation or the examination of pharyngeal secretions in the detection of tuberculosis.

DR. SIMMS: I would like to know if Dr. Roadhouse has the hypodermic needle which he uses. I have made the test and always had difficulty with the needles I used. They are not satisfactory.

DR. DAY: I would like to ask Dr. Roadhouse which test he finds the most practical, the subcutaneous or the intradermal? It is a question in our state as to the practicality of it—the time consumed in applying the tests. The accuracy of it, I think, is pretty well tested, but it is a question as to which is the most practical.

DR. DALRYMPLE: I would like to ask Dr. Roadhouse if he found any difference in the season of the year in which he made the tests? That is, the hot or the cold season?

DR. ROADHOUSE: I wish our cattle in California were as free from tuberculosis as the animals which have been reported from Missouri, or Kansas City. Dr. Kinsley has been fortunate in coming in contact with animals which are quite free from tuberculosis. I would like to ask Dr. Kinsley if these were beef animals or dairy animals?

DR. KINSLEY: Cows used in the ordinary dairies in and around the city.

DR. ROADHOUSE: Usually in California when we test that kind of stock, especially if they are in dairies that have a hundred animals or more, we find from 20% to 30% reacting.

DR. KINSLEY: We test our cows every year, and the reacting animals are sold to the packing houses.

DR. ROADHOUSE: In checking the intradermal and subcutaneous methods as Dr. Kinsley has testified, the results seem quite good. In this testing, may I ask, if the best animals which were re-tested by the intradermal method were given the subcutaneous test also?

DR. KINSLEY: On the Missouri side of the state line, we used the intradermal test once a year, testing all dairy animals supplying milk in Kansas City.

DR. ROADHOUSE: Do I understand that you sometimes use the subcutaneous test?

DR. KINSLEY: No, the state line divides Kansas City, Missouri, and Kansas City, Kansas, and our stock yards are on the line. The cows going to Kansas are checked and tested by the subcutaneous method.

DR. ROADHOUSE: Then you did not check the intradermal test as against the subcutaneous?

DR. KINSLEY: No. Not in the last six or seven years. We do sometimes get cows in Missouri which have been recently tested in Kansas, according to the Kansas regulations.

DR. ROADHOUSE: From the report which Dr. Kinsley gives from his section, it would seem that he did not talk upon the point I thought he referred to. It was a question concerning the results from the intradermal test as compared with the results from the subcutaneous test, which I was interested in.

DR. RUTHERFORD: I would like to ask whether any note was made of the proportion of the newly purchased animals which reacted after the second test. Six months later you tested 1080 cattle. If you tested 1080 there must have been 104 newly purchased cattle. What I wanted to know was whether in your testing, you had checked the number of newly purchased cattle which reacted as against the old stock which had already passed the test?

DR. ROADHOUSE: It was checked only in this way: in the data which I gave, where the effort was made to determine what percentage of reacting animals were from the animals recently purchased, as I gave in the report, 82 animals reacted during the past year (July 1, 1914 to July 1, 1915). Of these 82 reacting animals,

65 I believe was the number, or 79% of them, were from animals which had been purchased during the last three years,—not during the last year.

DR. RUTHERFORD: You say you had 976 cattle that had passed the test and were presumably free from tuberculosis. To those animals you added 104 new animals. What percentage of the newcomers reacted to the second test? That is the point I would like to get at. I have had a good deal of experience in cleaning up dairy herds, and I must say, like you, I was more than delighted to hear of the astonishing success attending the work in Kansas City, as I never ran across anything like that. It certainly speaks well for the health of the stock in Missouri and Kansas. I don't think we would find that condition anywhere else, on this continent or the old world either. I was particularly interested in endeavoring to discover how much of the disease had been introduced by these newcomers.

DR. ROADHOUSE: That question I think I can only answer by the figures I gave, that 79% of reactors last year were from purchased animals within the last three years. I have not the figures except in that form.

DR. RUTHERFORD: That would imply, I suppose, that the great majority of those reactors to the second test were cattle that had been purchased in the interval between the first and the second test.

DR. ROADHOUSE: When this work was done it was not with the idea of preparing a report for this meeting, so that I am obliged to take only such results as our records show, and that question can be answered only in the general statement which I made about purchased animals.

In reply to Dr. McNair's question as to whether any work was done in the matter of pharyngeal secretions: I can say that it is not a part of the routine work, and as the work is not done as an investigation, we cannot make any report on that.

There are two bulletins which have been published within the last two years, one by the California Agricultural Experiment Station by Haring and Dow, and one in Montana by Welch, and both of these bulletins show the apparatus which they used in this work. I might say that a very small dental syringe is the type used with the intradermal method and to that is attached a needle about one-fourth inch in length and the injection is made in the folds of the dermis, so that the needle is not long enough to pass through the skin.

DR. SIMMS: I wrote to Dr. Welch and he said the one which he illustrated was not a satisfactory syringe, and that he had been looking for years for the right thing but had not found one which exactly suited him.

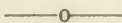
DR. ROADHOUSE: I find the syringes usually made and sent out by the biologic people are not durable. A 6 c.c. subcutaneous syringe is put up for the subcutaneous test, fortunately the threads

of the small needles which we can purchase will screw onto the 6 c.c. syringe, and will be tight if a few rounds of thread are wrapped in the threads of the syringe, and with care in connecting the small needle with the large 6 c.c. syringe, we are able to inject 30 to 40 head with one syringeful, and it works satisfactorily, because the larger syringe is more durable.

In answer to Dr. Day's question as to which test is the most practical, I would say a review of the work which has been done by the men mentioned and others would lead us to believe, that animals will react through the intradermal test in certain cases which do not react to the subcutaneous, and in other cases animals will react to the subcutaneous test which have failed to react under the intradermal; that with the proper interval between the tests, the actual number of reactions, in a given herd, results when both methods are used. Writers on the intradermal test recommend it particularly for range cattle because it is not easy to conduct the subcutaneous test on relatively wild animals, and for animals which have high temperatures. It may also be used for hogs, as their temperatures are irregular from handling, and young stock which are not suited for the subcutaneous test. It also seems to be considered preferable to the subcutaneous in climates where the temperature of the air is higher than that of the animal, on account of the difficulty of keeping the thermometer down to the proper temperature,—low enough so that the subcutaneous test is reliable.

DR. KINSLEY: Mr. President, I would like to ask Dr. Rutherford, if he questions my statements, to write to our state department at Columbia and get some reliable information about the use of tests, or get some of the B. A. I. reports concerning the test in the Kansas City Live Stock Yards.

DR. RUTHERFORD: Not for one moment did I question the veracity of Dr. Kinsley's statement. I simply took the liberty of commending him on the particularly good health of the stock in his section:



AN IDEAL STATE LAW FOR COOPERATION BETWEEN STATE AND FEDERAL AUTHORITIES IN THE WORK OF ERADICATING CONTAGIOUS ANIMAL DISEASES

C. J. MARSHALL, State Veterinarian, Harrisburg, Penn.

It is the duty of the Federal Bureau of Animal Industry to prevent the introduction or spread of the transmissible diseases of animals to or within federal territory under its jurisdiction. In accordance with state rights it is presupposed that each common-

wealth is prepared and equipped to handle such diseases within its borders.

The Organic Act of May 29, 1884, establishing the Federal Bureau of Animal Industry, specifically provides for the cooperation of states and territories in the eradication of contagious, infectious and communicable diseases and in the execution and enforcement of this act. It also provides that when the properly constituted state authorities signify their readiness to cooperate for the eradication of communicable diseases, the Department of Agriculture is authorized to expend for disinfection and quarantine measures so much of the appropriation as may be necessary to prevent the spread of the disease from one state or territory to another. Furthermore, provision is made whereby any individual may furnish information regarding diseased animals and may bring violations of this act to the attention of the United States Attorney of his district whose duty shall be to prosecute such violations.

When from the nature and extent of the disease it is feared that it may get beyond the control of the local authorities and spread to other states and countries the federal government takes all possible precautions to prevent such an occurrence. The federal government has a legal right to quarantine a state and to prevent the interstate movement of livestock or anything that may carry contagion, endangering the livestock of another state or country. It cannot establish or enforce quarantines against livestock on premises or portions of territory within a state except as to the interstate movement of such livestock, neither can it force an entry or compel the destruction of animals or property. A state cannot do so unless it is provided with the necessary legislation.

Under the present organization of the federal bureau an efficient veterinary sanitary force is maintained at all times and is in readiness for emergency work. Under ordinary conditions this force of men render valuable public service in the work of meat inspection, tick and scab eradication, and are able to conduct research work on many diseases. In the past such work has proven of inestimable value to the livestock interests of the country. In cases of emergency it is always available for quick and efficient action. Each state should maintain a somewhat similar service. Such men could be used to advantage at all times. The federal government is not able to look after meat hygiene work in houses that are not doing an interstate business. It is reasonable to suppose that the

poorest class of animals is slaughtered in places not under inspection. About 60% of the cattle, sheep and hogs slaughtered in this country are subjected to a federal inspection. This leaves 40% of the meat supply of every state which is uninspected.

Milk hygiene is even more important and very little is done in the various states on this subject.

The meat and milk hygiene service, and the minor transmissible diseases of animals, that should be looked after by the state would furnish an abundance of work for a good-sized veterinary sanitary police force. With such a force it would be possible for the state to furnish trained men to co-operate with the federal forces in case of emergency. In this respect most of the states have been remiss in the past and in a great majority of cases were able to furnish no experienced, well-trained assistants to co-operate with the federal forces.

Aside from the regularly employed agents of the state and federal governments, each state should have an abundance of well-educated and efficient veterinary practitioners who may be called into public service when needed. All veterinary practitioners should be compelled by law to report promptly all dangerous communicable diseases of animals. In controlling foot-and-mouth disease the private practitioner can render most valuable service. The State Veterinarian in Pennsylvania is authorized to employ local practitioners to do any kind of work when it is deemed necessary. In this way a large number of competent men scattered over the state are in constant touch with the work of the Board. They are kept informed and are familiar with the laws and regulations, and most of them can be called upon for assistance in cases of emergency.

It is also important that the state furnish adequate means for a thorough veterinary education to a sufficient number of men to look after veterinary sanitary police measures. The day and generation have passed when men with business ability alone are considered prepared to be entrusted with matters which involve technical knowledge which they do not possess.

Practically every state loses more than five per cent. of its livestock valuation each year from preventable diseases. Veterinarians should not be criticised for inability to prevent such losses when the state provides inadequate means, or none at all, for properly training men in matters of animal hygiene and furnishes no money to control or eradicate these diseases. Very few of our

states spend any money for veterinary education. If five per cent. of the preventable losses were spent for veterinary education and veterinary hygiene work in each state, the work could be done satisfactorily and millions of dollars saved annually for other purposes.

The general plan of organizing the work of co-operation between the federal and state forces should be carefully planned and thoroughly understood by both sides when it is necessary to combine forces to handle unusual conditions, as is necessary in exterminating foot-and-mouth disease, or other possible diseases that are equally as important. This would depend to a great extent upon the equipment of the state. It is especially true in reference to the number of available men, their qualifications and experience. The outline of the work to be covered in foot-and-mouth disease, for example, is somewhat as follows:—

1. Locating the disease.
2. Placing quarantines on premises and territory.
3. Appraising livestock and other property.
4. Preparing burial trenches.
5. Slaughtering diseased herds.
6. Disinfecting premises.
7. Farm-to-farm inspections.
8. Issuing permits.
9. Releasing quarantines.
10. Auditing and paying the bills.

The federal and state forces should each have a main office, and an efficient and sufficient office force to handle the business promptly and accurately. If the disease is wide-spread, the infected territory should be divided into districts and a competent, experienced man, who is familiar with the territory and the people, placed in charge of each district. It is best perhaps for both the federal and state governments to have a representative in charge of each district. If so, these men must understand each other thoroughly and work in absolute harmony. If this cannot be done, each had better be given a separate territory or separate duties and then held responsible for his part of the work. Where the work is done together, each should have free access to the other's records at all times and the field work should be routed and planned together so that duplications will be avoided.

The districts should not be too large. The men in charge should be in daily touch with the working force and at the same time keep

the main office informed daily of the progress and new developments.

In reference to locating centers of infection, the main office should know where the suspicious shipments have been received and, by co-operating with the railroad officials, shippers, dealers, etc., this information can be obtained.

The general public should be informed through the public press, agricultural papers, fliers, posters, public meetings, etc., of the presence and location of the disease; the symptoms, nature and importance of the disease and the measures to be adopted to prevent and eradicate it. In most cases the owner will report suspicious symptoms, either to his local veterinarian or to the state or federal officers. This plan should be encouraged in every way possible. It has been very unusual for owners to hide or attempt to hide the disease and it is believed that if they can be assured of prompt and fair settlement, none would deliberately try to deceive the proper officials.

As soon as the disease is located, or where there is reasonable suspicion of its existence, and where susceptible animals have been exposed to the disease, a special quarantine should be placed at once. Local, federal and state agents should have authority to place such quarantines. If possible to do so, a guard should be placed over the premises. Curiosity on the part of stock-owners and others to see how the disease looks is often responsible for its spread. A quarantine alone is not enough to keep such people away. Necessity often demands that the people on quarantined premises must leave the place. This might be done safely if a guard were present to disinfect their shoes, fumigate their clothing, etc. By this plan it would also be possible for children on quarantined premises to continue their school work safely.

Special quarantines, or those on a district or section of country, should be handled by the main office. The method adopted by the federal bureau in classifying territory as free, restricted, exposed and closed was considered satisfactory, and should be followed as closely as possible by the state authorities. It is not practical in all cases for the state and federal quarantined area to be divided in the same way. A state may consider it safe to move animals within the federal quarantined area for certain purposes, when the federal government could not permit such a movement across a state line. The state authorities may not be satisfied to accept shipments from

out of the state when government regulations would permit them. The main office should look after details of this kind.

On the matter of appraisements, a representative each of the federal and state governments should work together. These men should be familiar with the breeds and prices of livestock, and be able to place a just valuation on animals and other property that is to be destroyed. In case the owner is unwilling to agree to the appraisal allowed, the Pennsylvania law provides for appointing sworn appraisers.

The slaughter method has been adopted as the best means for controlling the disease and the sooner it can be done the better. An experienced person should be selected to destroy the animals. If any safe way can be devised to slaughter exposed animals, and save the hides or the carcasses for food it should be done. It is seldom feasible to manage the destruction so as to accomplish this saving, for the reason that it is not safe to move exposed animals to slaughter houses; there are seldom any facilities for conducting the work on the farm and moreover there is but a limited market for the meat slaughtered on the farm.

As soon as the animals are disposed of, the premises should be promptly disinfected. This should be carefully and thoroughly done under the supervision of a man especially trained for this kind of work. Reinfections occurred in very few cases during the past outbreak, yet, much of the work was done in very cold weather under adverse conditions.

Farm-to-farm inspections may be done by either state or federal men. The diagnosis should be verified in all cases and the most experienced and reliable men provided to examine all doubtful cases. There is perhaps more danger of diagnosing other conditions as foot-and-mouth disease than there is of failing to recognize and include true cases. The diagnosis is not always easy. It is especially difficult in those cases that have partially recovered, and in many instances at the beginning or the ending of an outbreak.

Permits for holding sales, moving livestock, hides, fodder, manure, etc., intra-state should be handled by the state forces. In most cases the state men are more familiar with the territory, people and the state regulations than the federal men.

Permits should be issued without expense to the owner, and by none except those specially authorized to do so. The federal men have rendered valuable assistance in an advisory capacity in the

matter of issuing permits. All transportation companies, stock yard companies, shippers and newspapers should be promptly notified by the main office of any changes in the regulations.

Before starting with the actual work of eradication a thorough understanding should exist as to the payment of accounts; not only as to the share of expense each party should bear, but as to the actual payment of same.

When it is decided that payment of claims is to be divided in a certain manner (as for instance, each paying 50 per cent.) instead of paying the claim by two vouchers, each for the exact share decided upon, it might facilitate matters and give more general satisfaction if such claims were paid in full at one time, either the state or the federal Department making the payment and being reimbursed by the other for its share of the expense. If a full understanding of the division of the expense were entered into before such expenses are incurred, no dispute would arise by this method, and better work might result. However, legal difficulties arising out of the prohibition against the federal government making loans must be avoided.

During the past outbreaks claims for cattle, etc., were paid by two vouchers, one by the state and one by the federal Department of Agriculture. It frequently happened that live stock were mortgaged to an extent of over 50 per cent. The share of neither department was sufficient to defray this mortgage, and as a result much confusion and delay took place in the settlement of such claims, with a corresponding degree of hardship and dissatisfaction on the part of the owners.

Funds should also be made available for the prompt payment of temporary laborers, such as men employed in the digging of trenches, the labor incident to disinfection, etc. Such funds were not always available during the past outbreak. It is extremely difficult to get competent labor quickly, and at the proper rate when the payment of wages is a matter of doubtful promptness. The majority of this class of workers are dependent upon their daily wage for their daily bread, and however good their claims might be they are not in a position to wait. This might be handled by special temporary disbursing agents, who could be bonded and sent out with the field parties.

It is extremely important that definite plans be adopted for obtaining funds and for making prompt payment of all just claims

when it is necessary to destroy livestock and personal property for the public good. In certain states the limit of appraisement has justly been raised to full market value in cases of foot-and-mouth disease. Some states have neglected to set aside funds for meeting such appraisements, but have trusted to the generosity of future legislatures to appropriate the money. This plan is too uncertain and far removed to appeal to our practical breeders and livestock men. Many of them are unwilling, and cannot afford, to accept promises that are not bankable. Colorado has adopted a plan that seems reasonable and just. It is as follows:—

The governor has authority, in emergency cases under certain conditions, to issue certificates of indebtedness. These certificates are practically notes of the state carrying four per cent. interest, and, under the constitution, the legislature is required to make an appropriation to care for such certificates whenever it meets. Under the law passed last winter in Colorado, in case of an outbreak of foot-and-mouth disease, or any other highly contagious disease, the stock board informs the governor and he authorizes the board to destroy such livestock and property as may be necessary, after the appraisement, and upon certificate from the board as to the indebtedness of the state, the governor causes certificates of indebtedness to be issued. As these carry four per cent. interest and are certain to be cashed at the first session of the legislature, they are practically the same as cash and will be accepted by all banks the same as any other security.

Under this plan the credit of the state is used for any amount that may be necessary to stamp out any serious live stock contagion. The plan is simple and, it is believed, will be effective.

Co-operation of state and federal government officials must exist to the fullest extent if prompt and efficient work is to result. The system of dividing the matter of expense equally between the state and federal governments, which existed during the recent outbreak, seems to have been just and equitable, and one which gave general satisfaction to all concerned. The actual work should be done on a fifty-fifty basis also, if possible.

The subject assigned for this paper was "An Ideal State Law for Co-operation Between State and Federal Authorities in the Work of Eradicating Contagious Animal Diseases". The "ideal" is so difficult of attainment that some authorities define it as "visionary, or existing only in imagination". Therefore, while having

an ideal in mind, I prefer to confine my efforts on this subject to a comprehensive law which may be tangible, rather than to an ideal which is only visionary. This is a matter which has received our attention and efforts for a number of years and has resulted in the adoption by the Legislature of Pennsylvania of what is known as the Act of July 22, 1913.

The inception of the present law was the act of May 21st, 1895, which created a State Livestock Sanitary Board, and defined its duties. The original act has been amended from time to time and was finally codified into what has proved an efficient and comprehensive law, under which we have been enabled satisfactorily to handle several epizootics, as well as the ordinary run of transmissible diseases which are of daily occurrence. It has also given us power to impose restrictions upon the interstate movement of diseased and undesirable animals and enables us to secure assistance from the federal Bureau of Animal Industry by a section which definitely provides for co-operation with the authorities of the National Government (Section No. 34). Such assistance is not confined to interstate cases, but may be and has been, available for work within the state.

The federal employees are appointed agents of the State Livestock Sanitary Board and issued identification cards. They then have the same authority as regular state agents, but receive no compensation from the state. In this way the federal men have rendered to the state valuable assistance. The Board has never had occasion to regret that such authority was given, but has felt under deep obligations to the federal government for the valuable service it has rendered in exterminating two outbreaks of apthous fever.

In the discussion of an efficient livestock sanitary law we must first consider the foundation upon which it is to rest. There should be provided a livestock board or bureau in the Department of Agriculture. Such body must be composed of men who shall be well versed in livestock diseases and not of so-called practical business men or practical farmers whose views will incline only toward minimizing the immediate financial losses occasioned by destruction of diseased animals. Under the direction of this body there must be an efficient corps of trained men whose services as sanitary police may be available at any time upon short notice. For this purpose it is not necessary to maintain a large standing force, but a small corps of regular employees may be used in an emergency as a nucleus

for the formation of a larger force to handle unusual conditions. Under ordinary conditions the regular employees may be profitably used in the work of meat and milk hygiene and in handling the usual run of dangerous diseases which are constantly encountered by owners of livestock. In order to be of greatest service the livestock authorities thus created must be provided with legal authority to enforce such requirements as may be deemed necessary.

Probably the most important requirements will be an efficient quarantine, which should be elastic as well as drastic. Such a quarantine could be made to cover all classes of animals, individually or collectively, and all materials which may convey contagion. It should also be made to apply to individual premises, as well as to all premises and territory within described boundaries. In addition to quarantine, a comprehensive law must provide for appraisement and destruction of animals and property, when such action shall become necessary in order to prevent the spread of disease. Provision should be made for equitable and prompt adjustment of all losses thus sustained.

In order that such a law shall have force it is necessary to provide penalties for infractions of the statute itself, of quarantines, and of rules and regulations adopted pursuant to the law.

In formulating the Pennsylvania law, these were the salient points around which were collected the auxiliary requirements necessary to place it on a workable basis.

While we do not presume to offer it as an "ideal", as we are aware of several minor points wherein it may be improved, we have found it to be sufficiently comprehensive to enable us satisfactorily to handle our sanitary work.

This law also empowers us to make rules and regulations for the enforcement thereof. Furthermore, it has been declared to be fair and just and has received the endorsement of the progressive and broad-minded livestock owners and breeders of our state.

The law should be broad in its terms; the powers conferred on the livestock board should be comprehensive; details should be omitted. Wide range of authority is essential if officials are to get efficient results, particularly in emergencies. An attempt to regulate minor matters in the statute itself is sure to lead to embarrassment and to hamper officials when they have to deal with unforeseen contingencies. No scheme which is elastic, and adaptable to all conditions, can be devised, unless it embraces power, lodged some-

where, to make changes and do unanticipated things, without the delay which would be unavoidable if an amendment of the law itself at the next session of the legislature were required before the board can move.

Vesting in the board power to make rules and regulations is the "ideal" provision for taking care of details. Such rules and regulations, of course, are not valid unless in harmony with the guiding principles prescribed by the statute.

The only serious inconvenience we have encountered in the operations of our law and regulations is the fact that in some respects they conflict with parallel laws and regulations of other states and those governing the federal Bureau of Animal Industry. These discrepancies are very confusing and embarrassing to transportation companies and shippers; also to livestock owners living near state borders. A railroad agent may receive rules and regulations from the federal authorities and half a dozen or more states, from which his road draws its livestock traffic. All of these regulations may differ on essential points and it will be impossible for the agent properly to construe the intentions of the various authorities. Nearly every regulation which may be drawn will be provided with exceptions to cover various classes of livestock and various exigencies which may arise, as in the case of livestock for immediate slaughter being differentiated from feeding or breeding stock and subject to an exception of the general provision of the regulations. That which is permissible under an exception to a regulation of one state may be prohibited by the regulation of an adjoining state which has not provided for such an exception.

In one instance a shipper obtained a permit in Ohio to move and ship a load of cattle. When the railroad agent refused to accept the consignment on the grounds that the Pennsylvania regulations prohibited the importation of such cattle, the shipper became incensed, threatened a law suit and to withhold his future patronage from that railroad. The shippers thought that by complying with the regulations of one state and obtaining an official permit, he was at liberty to carry out the intention of his permit.

In another instance a shipper obtained a permit from a federal agent in New York to ship a load of dairy cows into Pennsylvania. After viewing the federal permit the railroad agent received and forwarded the consignment. At that time the Pennsylvania regulations forbade the importation of dairy cattle and when the ani-

imals arrived at destination, were quarantined and held under observation for six weeks, which occasioned loss and inconvenience. It was natural for the shipper in this case to assume that the federal authorities had jurisdiction over interstate shipments. His assumption was correct in so far that the federal authorities could forbid the interstate shipment, but was wrong in assuming they could affirmatively authorize it in conflict with Pennsylvania regulations.

If these objections can be overcome by the adoption of uniform laws and regulations by all states, in conformity with similar laws and regulations of the National Government, we will make rapid progress in the work of livestock sanitary control. There does not appear to be any serious difficulty in the adoption of a uniform national and state law, but when we approach the subject of uniform regulations we will probably encounter numerous perplexities and controversies, owing to differences of sanitary problems in various sections of the country. This will be especially true in regard to interstate movements by common carriers.

It may be of interest to refer to a difficulty of this nature which arose in our state during March, 1915, at a time when the foot-and-mouth disease outbreak was under control, and restrictions were being gradually lessened. Under federal regulations it was permissible to ship livestock, for immediate slaughter, out of federal modified and exposed areas. The Pennsylvania regulations forbade such shipments to enter our state, and were even more drastic in forbidding such shipments to pass through the state enroute to other states.

A reference to the map will show the keystone position held by our state, as such shipments could not reach New York, New Jersey or the New England States except by passing through Pennsylvania or Canada and, of course, Canada was closed to livestock from the United States.

From certain experiences we felt justified in adopting and enforcing our own state regulation; so far as we are aware no other state adopted a parallel regulation. Hon. Francis Shunk Brown, Attorney General of Pennsylvania, declared that we had legal authority under the sanitary law, to adopt and enforce such a regulation. Hon. Martin G. Brumbaugh, Governor of Pennsylvania, upheld our action as being an advisable precautionary measure to prevent reintroduction of foot-and-mouth disease into the state. The regulation was also endorsed by various breeders' associations.

Of course, the railroad authorities vigorously opposed our action, but after a conference, at which our position was clearly and forcibly stated, the railroads withdrew their objections and took immediate steps to comply. As far as practicable such situations as the above, and all other problems which may arise, should be anticipated and uniform regulations be prepared for adoption by the various state and national authorities.

Such uniformity should cover so far as practicable the transmissible diseases of animals, the manufacture, sale and use of biological products and meat and milk hygiene. Municipalities and local boards of health should adopt the laws and regulations of the state and the state should follow the federal government.

Probably the best method for attaining the desired uniformity would be for the federal authorities to have supreme jurisdiction over livestock sanitary control work in each state, with the state organizations acting as auxiliaries and being in immediate charge of the field work. I realize that this proposition is somewhat visionary and approaches too closely to the "ideal", to be practical at this time. But I am convinced that a final solution of this problem of uniformity can, and probably will, be worked out along these lines, just as has been done in the case of the military forces of the various states.

The Pennsylvania law has stood the tests of the lower courts in a number of instances and its constitutionality has been upheld by the Superior Court. The opinion rendered by the learned Judge Orlady of the Superior Court will be gladly forwarded to anyone who may desire it.

LARGE AREA TICK-FREE. Areas amounting in the aggregate to 12,313 square miles, situated in the states of Alabama, Arkansas, Louisiana, Mississippi, North Carolina, and Virginia, was freed from the tick quarantine on December 1. Previous releases bring the total for the year's work to about 50,000 square miles—the greatest area released in any one year since systematic tick eradication was begun in 1906. At that time there were 741,515 square miles under quarantine; there are now 465,733 square miles, or less than two-thirds of the original area.

WHAT GENERAL AND WHAT SPECIFIC RULES SHOULD BE OBSERVED IN FIXING THE PERIODS AND DURATION OF THE DIFFERENT FORMS OF QUARANTINE AGAINST FOOT-AND-MOUTH DISEASE*

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The assembling of men for the purpose of discussing the subject of quarantine and its application to a particular disease is not new to sanitary science. The term itself refers to the old sanitary system of detention in the lazarets of ships and men for forty days for the purpose of fumigation. Quarantine dates back to 1348. Since that time, there have been many international conventions on the subject. Paris, Vienna, Constantinople and Rome have each entertained gatherings of this kind. However, it was in the conference at Venice in 1892; Dresden in 1893; Paris in 1894; and again at Venice in 1897 that the controverted points were settled relative to the rights of communities to close their borders to any and all traffic that was liable to carry infection to other individuals or countries. There is, perhaps, no other topic in preventive medicine that has received more careful attention than this. The necessity of quarantine has been recognized and already statutory authority has been given to the proper officials by state and national legislative bodies to enforce it whenever it is deemed necessary in order to prevent the spread of a communicable disease. The principle, therefore, that such protection is a legal obligation is clearly established and the correlated question of authority to enforce it is granted throughout the civilized world.

The adjusting of a quarantine has been a matter of much controversy. From the beginning its purpose has been to protect men and animals against infectious diseases. While this appears to be simple, many perplexing questions have arisen relative to the requirements to be observed when the quarantine is laid either as a means of eradicating or as an aid in combating infection. The two most important are to determine the time necessary to enforce it and the restrictions required to insure its efficiency. For centuries the time was an arbitrary period fixed by the authorities. The rec-

*Read at a Conference called in Chicago, November 29-30, by Assistant Secretary of Agriculture for the discussion of foot-and-mouth disease.

ords show that the effect of such a definite time was satisfactory in many instances but there were numerous exceptions. In some instances these allowed new cases to arise which became centers for the further spread of the disease. However, such quarantines did much to hold the plagues in check. That was all that could be accomplished, for the nature of the disease was not understood.

In recent times, the development of definite knowledge concerning the cause of the diseases to be guarded against has shed new light upon the requirements of quarantine. After the etiology of the plagues was known; when the channels by which the virus escapes from the body were recognized; when the degree of resistance of the infecting agents to external influences was determined; and when the ability of the virus to find another host was understood, it was easy to explain that for the protection of a community a quarantine could not be raised arbitrarily but should be held until the individuals thus segregated are no longer capable of transmitting the virus. This changed the practice of holding a quarantine for an arbitrary period to one that fixed its duration in accordance with the time during which the infected individuals are dangerous. In addition to this, such restrictions were added as necessary to prevent the escape of the virus.

Those who reason in terms of mathematical precision may have difficulty in understanding that animals alike in all obvious respects, which become infected with a given virus, at the same time do not die or recover and eliminate the germs from their bodies in a like manner. The fact is they usually do not. Why this is so has not been entirely explained for the phenomenon is a struggle between two vital forces, the individual infected and the invading organisms. The resistance of the host is not known and the invading power of the organism is not determined. As the struggle comes to an end the animal body may entirely free itself of the virus or a few of the organisms may remain in some tissue or organ where they may multiply and from whence they may escape for a very long time to infect others. These are called "carriers" or spreaders and they present the most difficult problems in sanitary science. Again, in the process of healing, a diseased focus may remain somewhere in the body which may become surrounded with protecting tissue and the individual appear to be fully recovered. The virus in these areas may die or, after a time, grow through the retaining wall and either start up the disease anew or escape from the body to infect other individuals. There are many illustrations of this,

the most conspicuous, historically, being the cattle that carried contagious pleuro-pneumonia from Europe to South Africa and Australia months after recovery was thought to have been complete.

Successful quarantine must take into account many factors. Most of them come to us not as clearly defined tangible facts but rather in the form of biological forces which manifest themselves in the unfolding of the disease. They are the controlling elements although they can be understood only in so far as our knowledge of infectious diseases is able to accurately interpret them. However, the principles to be observed are clear. The quarantine is placed to prevent the spread of the virus. It must be maintained until there is no danger of the animals transmitting it either immediately or at any future time. It is difficult for those not trained in the habits of microscopic life to appreciate that viruses are vital forces that take no heed of the opinions of men. The fact cannot be too forcefully emphasized that naturally infectious diseases are spread in accordance with the means—simple or complicated—provided by the laws and forces of nature for that purpose. The agencies for the transmission of infectious diseases were not designed for the convenience of animal owners or sanitary officers but rather to enable the virus of the disease to perpetuate itself and to be transferred from the infected to the uninfected individual. We should not forget that the virus of foot-and-mouth disease, for example, is a definite factor in nature's economy and is provided for quite as much as the perpetuation of other living things. We look upon the transfer of pollen by the insect in the fertilization of clover as a wonderful provision of nature because clover is useful to man. The transfer of the virus of a plague from one host to another is often just as wonderful and always just as securely provided for, but, because its effect operates against human interests, there is a tendency to condemn and to pass judgment without knowledge.

The fixing of a quarantine period and defining its specifications are dependent upon the character of the disease and the nature of its etiology. There must be knowledge of the location of the virus within the host, of the time in the course of the disease it is eliminated and its ability to spread after escaping from the body in order to adequately safeguard against it. Again the purpose of the quarantine modifies both its duration and requirements. If it is to protect a community against the introduction of a foreign disease it is obviously more drastic than if it is used only as a temporary means of combating the malady. When employed for

permanent protection it should remain for the maximum period of incubation and for the longest known time required for the lighting up anew of arrested lesions. In case of certain diseases the virus, after it escapes from the body, is able by numerous and insidious ways to disseminate itself to such an extent that it is difficult or impossible to confine it to the quarantined area. These are all important considerations in determining just what procedure shall be followed. In any case a margin of safety must be allowed.*

In order to apply the principles underlying quarantine to foot-and-mouth disease it is necessary to have the knowledge obtained from clearly defined answers to the following questions, namely:

1. What is the nature of the virus?
2. What is the period of incubation?
3. How does the virus escape from the body and by what agencies is it carried from the infected to the susceptible animals?
4. How long after apparent recovery are the animals capable of transmitting the virus?
5. Is it possible by practicable quarantine methods to prevent the virus from spreading after it leaves the body?

Because of the extreme infectiousness of this disease it has not been studied experimentally in this country. The work with it has been regulatory and for the purpose of diagnosis. The character of the virus has not been determined other than to learn that it will pass through bacterial proof filters and that it escapes from the open lesions of the affected animal. The period of incubation varies within undetermined limits. Exposed animals, as a rule, develop symptoms in from three to seven days but in occasional cases it is much longer. In New York it was found that now and then two and three weeks elapsed before symptoms appeared. After the virus escapes from the lesions it is carried on any article with which it comes in contact—the clothing or hands of attendants, on food, litter, implements, domesticated animals or insects.

The troublesome cases are those that carry the virus after healing. There are reports that animals have infected others months after apparent recovery. These are exceptions but they

*Rabies affords a good illustration of this. The average period of incubation of rabies in dogs is less than 40 days but by enforcing a quarantine of six months on all dogs going to Australia the disease has been kept out of that country.

affirm the possibility of such individuals spreading the disease for this period and we do not know for how much longer. Unfortunately we have no means of determining in advance how long an infected animal may harbor the virus. Zschokke investigated its ability to remain in the feet. "He found the vesicles which occur in the skin of the interdigital spaces and the plantar cushion may also extend under the horny capsule forming there, furrow-like spaces along the sensitive laminae of the wall and sole. He also found hidden vesicles in the hoof which did not open to the outside. The virus would remain there until it was brought to the surface by the natural wearing away of the hoof." There is nothing to prevent animals thus affected from eliminating the virus for an indefinite time. Loeffler, after careful investigation, recommended that no animal that had recovered from foot-and-mouth disease should be permitted in the channels of commerce.

A factor of still greater significance is the ability of the virus to escape by insidious ways and to be carried from the infected to well animals notwithstanding the barriers of quarantine. It is so difficult because of the many possible carriers, that Dammann stated it could not be prevented. He did not mean that infected cattle could not be isolated long enough, in insect proof enclosures with efficient guards, but that it was impossible by the usual or even more than ordinary rigid enforcement of quarantine regulations to prevent the virus from escaping and infecting other animals. His conclusion is confirmed by the best live stock sanitarians of Europe. It is the verdict rendered after long experience and observation by men who have endeavored to eradicate foot-and-mouth disease by quarantine and police control. In passing judgment upon this phase of the subject we must not be controlled by the experience with a few herds or even outbreaks. Data from many infected districts and numerous epizootics are required, for by the laws of chance, fortunate results may, in a few cases, follow any procedure. In this country, where experience with this disease is very limited, we are not in position to judge unless we supplement our knowledge with the results of those whose experience is sufficient to indicate the shortcomings and value of quarantine. We are dealing not with a local question but a nation wide problem. Because of this greater responsibility our quarantine regulations should be safe, reliable and sound.

I have dwelt somewhat at length on the principles underlying

the determination of the important factors in quarantine for the purpose of pointing out the many elements involved in safeguarding our live stock interests by this method. Until more data are available the best we can do is to live up to the knowledge we possess unswerved by individual experiences to the contrary. When Captain Ross went to India to study the mosquito as a carrier of malaria he was often almost persuaded that the accused insect was innocent. He laboriously studied, one after another, 999 specimens in vain but the thousandth one revealed the story of the anopheles as the intermediate host and spreader of the malaria plasmodium. There is a common tendency to yield to the findings in a limited number of cases. There are people willing to formulate regulatory measures suggested by a personal experience. While such experiences have their value and while they may represent the majority it is well to remember that although it is the usual that ordinarily happens, it is the unusual that most often causes the trouble.

As I understand it, the questions involved are the object of the quarantine and the enforcement of its requirements.

There are two clearly defined purposes for which quarantine has been employed in connection with foot-and-mouth disease, namely, first to control it, and secondly to temporarily check its spread until drastic measures can eliminate the diseased animals and render safe the premises occupied by them. There is no other disease that ever gained entrance to this country so difficult to restrain by quarantine as this, due not only to its high degree of infectiousness but also because practically all species of animals are susceptible. Again, the undetermined limit of time that recovered animals may be carriers cannot be dismissed without careful consideration. Both Hess and Loeffler* found that a limited number of recovered animals carried the virus for seven months. Never-

*Loeffler's conclusions relative to virus carriers are as follows:—

“Regular supervision of such farms is indispensably required.

“One of the most important results of the researches concerning foot-and-mouth disease is, that the fact has been doubtlessly ascertained that, just as in numerous human infectious diseases, some of the recovered animals will remain carriers and continue the spreading of the virus.

“It seems that the number of such animals is limited.

“How long such animals can spread the virus, has not yet been ascertained. According to present experiences, even 7 months after the end of the epizootic, new infections have been caused by them.

“As yet no method is known to distinguish the virus spreaders.

“Infected animals are to be placed under observation for at least 7 months. They must not be offered for sale, and should be kept separated from healthy animals.”

mann in his last annual report of the Veterinary Officers of Prussia pointed to more than one hundred outbreaks of foot-and-mouth disease attributed to virus carriers. The experience in practically all European countries points to the failure of quarantine as a means of eradication. The outbreak in Germany in 1892 which cost that country \$25,000,000 and again in 1911 with a still heavier loss speak with emphasis on the weakness of this method. When such veterans in sanitary science as Dammann state that it is impossible to enforce a sufficiently strict quarantine to hold the virus of this disease in check, it seems presumptuous for us to consider it otherwise. When men like Loeffler and Hess find animals seven months after recovery capable of spreading the virus we have no experience in this country, and there is none in any other, to deny the possible danger of allowing recovered animals to go at large within that time.

From the present knowledge of foot-and-mouth disease and the available data concerning methods for its control two kinds of quarantine seem to be necessary—namely, federal and local.

The federal quarantine is imperative for all animals coming from countries in which foot-and-mouth disease exists. It should be rigidly enforced and maintained so long as there is a possibility of the animals transmitting the virus. In addition to this, strict supervision of all imported articles or substances that might bring the virus is essential. The outbreaks of 1902 and 1908 illustrate in a striking manner the necessity for such care.

The local quarantines need not be considered at length. They are, however, of the greatest importance in checking the spread of the disease. The Secretary of Agriculture has formulated regulations for this purpose and issued them as B. A. I. Order No. 231.*

“(a) Quarantined area: Any State or any portion thereof quarantined for foot-and-mouth disease in live stock.

(b) Closed area: Those portions of the quarantined area from and to which the interstate and foreign movement of cattle, sheep, other ruminants, and swine is absolutely prohibited, and the movement of the dressed carcasses of such animals, the hides, wool, hair, horns, or hoofs of such animals, and of hay, straw, or similar fodder, manure, or litter is restricted.

(c) Exposed area: Those portions of the quarantined area from which the interstate and foreign movement of cattle, sheep, other ruminants, and swine is permitted for immediate slaughter after inspection and certification, and into which such animals may be removed for any purpose, also from which the interstate and foreign movement of the dressed carcasses of such animals, the hides, skins, wool, hair, horns, and hoofs of such animals, and of hay, straw, or similar fodder, manure, or litter is restricted.

(d) Modified area: Those portions of the quarantined area from which

This order leaves little to be added unless from experience changes or additions seem to be necessary. It provides for rigid quarantine of the affected premises and the country immediately surrounding them, and, under proper veterinary supervision, it permits the limited movement of animals in the next adjacent zones. This plan in itself is excellent. There is, however, need for a better mechanism for promptly enforcing it in the different states. Many of them are not organized in such a way that immediate action is assured. The delay of a single day may cause heavy additional losses. To guard against this there must be a closer sanitary supervision. We should find, if possible, the best method of bringing this about. I suggested district veterinarians under the state veterinarian whom animal owners and practitioners could call at once and who should have authority to enforce quarantine measures and to aid in making the diagnosis in cases of doubt. They would serve as sanitary supervisors and their territory should be no larger than they can properly cover. An expert district veterinarian would give both technical assistance to practitioners and have authority to enforce, whenever necessary, regulatory restrictions. The enormous value of our live stock warrants the necessary expenditures for efficient protection.

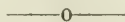
Whatever system of quarantine is finally adopted, the federal and state governments should recognize their obligation to the animal industries of the country. They should be prepared to meet emergencies. In the eradication of an epizootic there must be co-operation. In plagues like foot-and-mouth disease where control necessitates the destruction of the entire herd, often of valuable animals, it would seem wise for our legislative bodies to consider adequate indemnity for the unfortunate owners. With proper precautionary measures such epizootics should be very rare. But if, perchance, they do appear and herds have to be destroyed, would it not be wiser and eventually cheaper to have indemnities sufficient to encourage co-operation rather than those that provoke opposition?

the interstate and foreign movement of cattle, sheep, other ruminants, and swine is permitted for immediate slaughter without inspection, and into which such animals may be moved for any purpose, also from which the interstate and foreign movement of the dressed carcasses of such animals, the hides, skins, wool, hair, and hoofs of such animals, and of hay, straw, or similar fodder, manure, or litter is permitted without any restrictions whatever.

(e) Free area: Those States or portions thereof which are not quarantined for foot-and-mouth disease, and on which no restrictions whatever are imposed."

Eradication is for the good of the public and those who are benefited might bear a part of the burden placed upon the owners of the condemned animals. A campaign of education should precede or accompany regulatory work. The people should learn that the slaughter of infected and exposed animals alike is not the motion of any individual but the method arrived at by the crucial test of research and experience. To be fully prepared each state as well as the federal government should have a definitely formulated plan of attack that could be applied immediately should foot-and-mouth disease or any other animal plague appear.

Finally the conclusion seems to be justified that when the disease appears in a country generally free from its infection like the United States, quarantine should be enforced for protection against all importations that may bring the virus. Local quarantine should be employed only as a means for temporarily combating the disease. Its eradication is to be accomplished by the heroic measures of slaughter and disinfection. This conclusion is reached in full recognition of what has been accomplished with quarantine in isolated instances and in certain infected countries like the Philippine Islands. The slogan should be "we cannot afford to have foot-and-mouth disease in this country."



CELL INCLUSIONS IN HOG CHOLERA

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In 1907, Halberstalter and Prowazek¹ found in the conjunctival epithelium of persons suffering from trachoma, inclusions of the cell outside of and next to the nucleus. The bodies are seen near the nucleus as irregular masses and they become larger and finally break up into granules. Prowazek held these inclusions to be the result of the reaction of the cell to the virus. Since this announcement many observers have reported on finding these bodies in trachoma. Some have ascribed to them the position of being the etiological factor. It appears to at least have been established that these cell inclusions are characteristic of trachoma. Cell inclusions received their first claim to importance through the work of

Negri, who found them to be of eminent diagnostic value in lyssa. Bodies within the cell have been observed in many diseases caused by the filterable viruses. The Benda bodies in epithelioma contagiosum, the Lentz canine distemper bodies and the Shiffmann bodies in fowl plague are all claimed by their observers to be of significance. Uhlenhuth,² in a general study of hog cholera, reports on the observations of trachoma-like bodies in that disease. These inclusions according to Uhlenhuth differ from the trachoma bodies in being slightly larger. They were found on the average in eight to ten days after the injection of the virus, sometimes in both eyes, sometimes in one and at times in the upper or lower lid only. In most of the hogs they soon disappeared. In a few cases, however, they persisted until death. In several cases the bodies were found four to five days after the injection of the virus. These bodies have also been observed in hog cholera by Meyer³ in an examination of a limited number of hogs suffering from this disease.



Cell inclusion from conjunctiva of cholera hog. (Plate was retouched).

The writer has systematically examined smears from the conjunctival epithelium of a number of hogs and has observed cell inclusions under various circumstances. We have never found the inclusions in the epithelial cells after death. All cells do not contain them even in a positive case. In fact the bodies are found in but a small percentage of the cells in a given microscopical field. The inclusions are found outside the nucleus in the cell protoplasm and vary in size from one-fourth to one-half the size of the nucleus. The protoplasm of those cells containing inclusions is more granular than the negative cells and presents granules staining more deeply and of the same staining qualities as the cell inclusion. The bodies observed by the writer were distinct and of regular structure, in that they were sharply circumscribed. Staining with Giemsa's solution, the nucleus is stained a deep blue, the cell protoplasm a pale blue and the inclusion body a purplish hue. The protoplasmic

granules are stained much the same as the inclusion and appear to be distributed in the immediate vicinity of the included body. In those cells containing the larger bodies the nucleus is compressed and distorted.

These bodies were found in ninety-five per cent of the cases examined during the period at which the body temperature was beginning to rise; in other words in the first stages of the disease. In only a small percentage of the cases were cell inclusions observed at the time the temperature was at its maximum, 106° to 108° F. Examination of the sections taken at time of death failed to show the presence of cell inclusions. Only a few cases have been examined in section however. Smears made from the conjunctiva of hogs after death failed to show the presence of inclusions when examined.

There is a great difference of opinion regarding the significance of these bodies, in rabies, trachoma and other diseases in which they have been observed. Whether they may be considered as the actual pathogenic organism, some stage of its life cycle or whether they are mere reaction products of the cell against the virus, is a question difficult to settle. In order to throw some light on these questions, Uhlenhuth produced mechanical inflammation of the conjunctiva in a number of hogs. After the inflammation had set in, smears were made and examined but no inclusions were found. Eye secretions from cholera hogs transferred to the conjunctiva of other animals, the ape, dog, cat, etc., failed to transfer the bodies. In the examination of one hundred and thirty hogs, only four or five per cent. showed the presence of the inclusions. Attempts to transfer these bodies to the conjunctiva of other normal hogs failed.

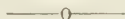
In a study of the Negri bodies, Watson¹ is lead to believe that they are definite protozoan parasites, placing them in the sub-order of Cryptocysts or Microsporidia of the Sporozoa. Spore stages were observed by Watson and if any analogy exists between the Negri bodies and rabies and the cell inclusions of other diseases, there may be some grounds for consideration of them as a stage of the life cycle of the etiological factor.

Wolbach, however, classes the trachoma bodies as non-parasitic, and as evidence of this he cites studies of sections which showed inclusions in only the thinned or superficial epithelium, while, were they parasitic, the deeper layers of the stratified epithelium should show the effects of the invasion. He concludes that trachoma bodies

are present in only injured epithelium and that granules of like appearance can be demonstrated as the result of disturbed mucous secretion. As regards the included bodies in hog cholera we have no evidence of their parasitic relationship to the disease. Uhlenhuth calls attention to the very high virulency of secretions from the eyes of pigs sick with hog cholera. The injection of this material in the amount that a capillary tube one centimeter long would hold, produced the disease in as short a time and in as severe a form as large amounts of virulent blood. While the high virulency of eye secretions suggests the possible involvement of the secretory cells of the conjunctiva, it would not be safe to consider these bodies of etiological significance in hog cholera. Noguchi has recently announced the successful cultivation of trachoma bodies *in vitro*, which should open the way for determining the relationship of cell inclusions in general to disease processes.

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HASSTILESIA TRICOLOR (STILES and HASSALL, 1894), A COMMON PARASITE OF RABBITS IN THE UNITED STATES

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In Europe the hares and rabbits are animals of some little importance as food animals. Meat inspection regulations contain provisions covering the conditions under which these animals may be passed for food or condemned; poaching among the rabbit warrens of private game preserves is a specific offense which carries at times rather severe penalties; and European veterinary papers not infrequently publish articles dealing with the diseases and parasites of rabbits. In the United States the status of the wild rabbit varies from that of game in the eastern United States to a pest in many

parts of the West, but whether we regard it as game to be preserved or a pest to be eradicated the parasites which affect it deserve a certain amount of attention.

In a paper now in press the writer has listed sixteen species of nematode parasites from hares and rabbits; a casual examination of readily available papers indicates that at least fifteen species of cestodes occur in hares and rabbits either as strobilate tapeworms or as bladderworms; while the following flukes, *Fasciola hepatica* (the common sheep liver fluke), *Dicrocoelium dendriticum* (a rather common fluke in sheep and cattle in Europe), and *Distoma tricolor*, and possibly others which have not come to my attention, have been reported from hares and rabbits. It is with the last named fluke that this paper deals.

Distoma tricolor, described from *Sylvilagus mallurus* (*Lepus sylvaticus*) and *Lepus americanus* by Stiles and Hassall in 1894, is of very common occurrence in the intestines of rabbits in Maryland, Virginia and the District of Columbia, being present in large numbers in every rabbit examined some years, though there are years when it is of apparently rather rare occurrence. Dr. Hassall tells me that it has also been found in heavy infestations, suspected of killing the rabbits, on Long Island, N. Y., by Dr. Austin Peters. Dr. Francis of the Texas Experiment Station tells me that this fluke is very common in jack rabbits around College Station, Texas. It is evident that a parasite which occurs from New York to Texas is of wide distribution and probably rather common. That it is not found or reported oftener is probably due to the fact that the fluke is about one millimeter long and looks something like a small seed to the naked eye.

The wide distribution and common occurrence of this fluke in American rabbits makes it desirable that it be referred to some genus other than the collective genus *Distoma*. It does not conform to the generic diagnosis of any existing fluke genus known to the writer and it seems necessary to establish for it not only a new genus, but a new family. I have accordingly created a new genus named after Stiles and Hassall, to whose collaboration veterinarians, physicians and zoologists are indebted for the immensely valuable author catalogues and host catalogues of the Bureau of Animal Industry and the Public Health Service. The status of the fluke is then as follows:

Superfamily Fascioloidea Stiles and Goldberger, 1910.

Superfamily diagnosis.—Trematoda: Flukes with organs of attachment consisting of an oral sucker and a ventral sucker which is situated not far from the oral sucker. Reproductive organs usually posterior of the ventral sucker. Body not subdivided. Hermaphroditic, with the exception of the Schistosomidae.

Type family.—Fasciolidae. Railliet, 1895.

Family Hasstilesiidae Hall, 1916, new family.

Family diagnosis.—Fascioloidae: Small, compact flukes of relatively great width. Genital aperture posterior of acetabulum, midway between this and the posterior end of the body. Two large testes, the posterior located in the median line, the anterior entirely to the left of the median line. The ovary is entirely to the right of the median line, lateral of both testes and either extends slightly anterior of the posterior testis or else overlaps the anterior border of the posterior testis and the posterior border of the anterior testis. Esophagus short: intestinal ceca extend to the posterior border of the body and are rather tortuous. Ovary is dorsal of the right intestinal cecum in the specimens I have examined: Stiles and Hassall state that it is ventral. Left testis is ventral of the left intestinal cecum.

Type genus.—*Hasstilesia* Hall, 1916.

Subfamily Hasstilesiinae Hall, 1916, new subfamily.

Subfamily diagnosis.—Hasstilesiidae: Characters of the family.

Type genus.—*Hasstilesia* Hall, 1916.

Genus Hasstilesia Hall, 1916, new genus.

Generic diagnosis.—*Hasstilesiinae*: Acetabulum slightly smaller than the oral sucker. Posterior testis in posterior third of body, anterior testis in middle third body. Genital aperture near the anterior border of the posterior testis. Cirrus pouch well developed. Vitellarium in middle third or anterior two-thirds of body; transverse vitelline ducts pass near the anterior border of the posterior testis. Laurer's canal present. Uterus extends from the so-called shell gland on the right side anteriorly around the acetabulum, descending over the left or anterior testis or between the testes, then back from the left side between the testes, the metraterm terminating to the left of the cirrus pouch at the genital pore. Ova ellipitical. Excretory system not well developed, excretory pore terminal, the very small contractile end portion giving off two fine canals.

Type species.—*Hasstilesia tricolor* (Stiles and Hassall, 1894) Hall, 1916.

Species *Hasstilesia tricolor* (Stiles and Hassall, 1894) Hall, 1916.

Specific diagnosis.—*Hasstilesia*: .65 to 1.2 mm. long by .35 to .64 mm. wide by .32 mm. thick. Body elliptical, showing three colors in fresh material, the uterine portion yellow to brown, the vitellaria white, the rest of the body gray. The anterior five-sixths (not two-thirds, as Stiles and Hassall state) of the body covered with minute instable spines. Oral sucker 88 to 112 microns in diameter. Acetabulum about one-fourth of the body length from anterior end. Intestinal ceca much looped dorso-ventrally and extending inward toward the median line just posterior of the acetabulum. Laurer's canal opens dorsally about half way between the acetabulum and the genital pore. Pharyngeal bulb about 40 microns in diameter. Esophagus about 30 to 40 microns long. Testes 160 to 272 microns in diameter. Vas deferens and penis well developed. Ovary 80 to 120 microns in diameter. Ova 13 microns by 20 microns.

Hosts.—*Lepus americanus*, *Sylvilagus floridanus* *mallurus* ("Lepus sylvaticus").

Location.—Intestine.

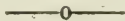
Distribution.—District of Columbia, Maryland, Virginia, New York, Texas.

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STILES:—Ch[arles] Wardell & Hassall, Albert.

1894:—Nouvelle espèce de douve intestinale (*Distomum tricolor*) chez le lapin à queue cotonneuse (*Lepus sylvaticus* Bachman) et chez le lièvre du nord (*Lepus americanus* Erxleben). [Abstract of 1895a, by Stiles] Bull. Soc. zool. de France, Par., v. 19 (9) nov.-déc., pp. 160-162, fig. 1.

1895:—A new species of intestinal fluke (*Distoma tricolor*) in the cotton-tail rabbit (*Lepus sylvaticus* Bachmann) and in the northern hare (*L. americanus* Erxleben) Vet. Mag., Phila., v. 1 (11) (Nov., 1894), Jan. 17, pp. 729-737, pls. 1-2, figs. 1-8.



SALMON MEMORIAL ADDRESS*

W. HORACE HOSKINS, Philadelphia.

I well remember, in the latter seventies, when our country was seriously turning its attention to the consideration of animal diseases and how it was confronted with the possibility of having contagious pleuro-pneumonia of cattle becoming a nation-wide scourge. I vividly recall the great conference at Chicago when it was found that it had reached Illinois and the possibilities of its

*Presented at the meeting of the Philadelphia Branch B. A. I. Employees.

extension to the great grazing plains of the unfenced territories of the West. The Treasury Cattle Commission was then the body charged with the responsibility of dealing with this animal plague. Conspicuous then among those who were gravely considering the problems of elimination was one whose name has since been enrolled on the nation's walls of fame as a great public servant.

A Commissioner of Agriculture followed the Treasury Cattle Commission and this official likewise recognized the intelligent and broad gauged services of this splendid representative of his profession and assigned him to several important posts of service—investigating diseases that were causing great losses to animal industry in various sections of our land.

When in 1884 the Bureau of Animal Industry was created by an Act of Congress, the position of Chief of that Bureau was given to this man and for twenty-five years no one ever filled an official role in the public service with greater fidelity, more intense zeal and distinguished achievements than this representative of his calling.

Some of you will remember that the cardinal act establishing this Bureau restricted the number of employees not to exceed twenty. When I realize that today it utilizes the services of nearly twelve hundred members of my and some of your profession in a quarter of a century's growth, I may be permitted to repeat here what I once stated on the floor of the Convention of the American Veterinary Medical Association that I knew of no man in my profession who under the trying vicissitudes of our politically governed country could have so well and faithfully filled this position as the now lamented Dr. D. E. Salmon.

Blessed with a well-balanced mind; fitted by a training in the best school of our land preparatory and professionally; signally endowed with a kindly disposition and warm-heartedness, keen of preception in selecting men for places they were well adapted to and of developing men for special fields of service as the needs arose, ever eager to conserve the highest and truest interests of his fellow man, to which end he bent every energy and force within him, never for a moment forgetting or overlooking the economic side of the varied problems confronting him in this great work; that our land might prosper and foster animal industry as one of its truest sources of real wealth; he labored on in the upbuilding of his department and gave of the best part of a good man's life—a service

rich in results—true in its aims and purposes and fruitful of untold and unmeasured blessings to the prattling baby at the mother's feet to the blossoming childhood; the blooming manhood and womanhood and the conserving of old age that comfort, peace and strength would be theirs even unto the end through a wholesome food supply.

Your positions, this association, your lives of useful helpful service to mankind and the uplift of your and my wonderful galaxy of states, is the outgrowth of the work so faithfully planted, so well watered and nurtured, so devotedly fostered and promoted by the lifetime of public service rendered by this man to whom I pay this loving tribute.

It was my great privilege and it was a precious one indeed, to have mingled thirty-five years of my own life in the veterinary profession with him as a co-laborer in the upbuilding of our calling that it might conserve man's needs and a country's growth with a fidelity to its highest purposes and I count it a rich treasure indeed that I enjoyed in this period his sincere friendship.

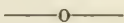
A politically governed country has the richest of charms and allurements and its pathway is likewise strewn with sore trials and bitter disappointments. Ingratitude is the basest experience of an official career. It was this good man's lot to taste of the bitterness of a nation's ruler's ingratitude. Time cannot efface nor memory obliterate the cruel, unjust and ungrateful treatment meted out to this great public servant, but a loving profession, a nation's benefactor can keep fresh the memory of those rich deeds, faithful trust he preserved and public services rendered and a nation's children's children may continue to rise up and call his name blessed.

Let us unite our efforts to fittingly perpetuate the good name of our co-worker and co-laborer. With loving devotion let us enshrine his memory in the annals of America of a life well lived, a work well done and through the perpetuation of the story of his public services, hold forth to future generations the richest reward of duties well performed, an honored and revered name among those who knew him best.

May I invite you all without regard to place or station, to contribute the most you can possibly give to the richest memorial that may grace a well lived career, not in gold or silver that may tarnish, not in marble or stone that may crumble and decay, not in canvas that time may obliterate, but in a living working fund that shall

aid the deserving student to an education in some aspect of your and my work, that shall establish a fellowship for advanced study in your and my field of service that our labors may be easier and lighter or an honorarium to some well deserving worker who has contributed some worthy addition to our knowledge and lessened our toil and responsibility.

In keeping with his modest, unassuming career, his lifetime of search for greater and truer knowledge, his restraint of boastful proclamation of great things achieved, his deep consciousness, at all times, of the greater problems to be solved, let us rear such a memorial as would have met his approval in life and make future generations more conscious of his devoted public services.



REPORTS OF CASES

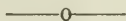
DEPIGMENTATION OF HAIR AND SKIN WITH RETURN TO ORIGINAL COLOR

I. O. DENMAN, Middletown, N. Y.

While at Walton, N. Y., I saw an unusual case which was very interesting to me as I have never seen a similar case and have been unable to find an account of one in the literature. The case was a bay gelding 7 years old, weighing about 1400 lbs. used by the Risley Lumber Co. of Rock Rift, N. Y. for hauling wood. This horse had a large cold abscess of the shoulder and was treated in my hospital, the abscess walls being sloughed out with copper sulphate, resulting in a complete recovery. About two months later my attention was called to the case as the foreman said the horse was getting speckled. This was indeed true as small areas of depigmentation were appearing over the entire body. These gradually increased in size until after 2 or 3 months the horse was covered with round white spots of hair and skin varying in size from that of a dime to that of a half dollar. There was not at any time the slightest trace of any inflammation, eruptions, or lesions of any kind on the skin. About this time the horse developed a slight case of heaves and daily doses of Fowler's solution and linseed oil were prescribed. Soon after beginning this treatment it was noted that

the white spots were no longer increasing in size and later a decrease in size was noted until after 4 months they had entirely disappeared leaving the original color of a solid bay.

To me the above case presents an interesting study. What is the cause of the depigmentation and why did it appear in areas? Was the copper sulphate a causative factor and did the administration of arsenic bring about the return of the pigment?



ANTITETANIC SERUM AND MAGNESIUM SULPHATE IN TREATING TETANUS

HENRY THEOBALD, Roselle, Ill.

During a period of 8 months I had occasion to treat 5 cases of tetanus with what I consider fair success.

CASE No. 1. In May, 1914 I was called to a case which the owner mistook for a case of founder but on my arrival found a typical case of tetanus.

It was a 12 year old gelding which when being unhitched from the wagon, had run away into an old wind-mill that had been torn down, thereby tearing a gash of 8-10 inches above the left knee, leaving an ugly lacerated wound. The owner said that he had washed the wound after it happened, but outside of the cleansing no more attention was paid to it until he called me.

When I examined the horse I found him all stiffened, with practically all muscles rigid. The membrana nictitans was very much in evidence; the tail curved to one side; the muscles of the neck as hard as a board and in fact unable to move due to general stiffness.

Locomotion was so impaired that it was dangerous to be near him for fear he would fall over, as every such attempt showed plainly that when he moved, it was with the utmost effort that he sustained balance.

The jaws were set but could be opened $\frac{1}{8}$ of an inch with some force.

The wound was grown over with an abundance of proud flesh, the knee swollen and very painful.

In standing he appeared as if straddling some object; at no time having the legs in a normal position, for about two weeks.

In the process of treatment I curetted the wound and gave it a cleaning with a strong solution of tr. of iodine and carbolic acid.

After curetting a long retaining cavity was thereby established, which I packed with absorbent cotton saturated with equal parts of tr. of iodine and carbolic acid, and left in the wound until the following day. Then I proceeded to give 1500 units of antitetanic serum (P. D. & Co.) and 40 c.c. of concentrated solution of magnesium sulphate, 20 c.c. behind each shoulder.

The necessary steps were taken to clean the parts where injections were made, as clipping the hair and washing and painting with iodine. (I mention this as abscesses formed which can not very likely be traced to infection with the needle.)

As the patient was unable to eat I advised the owner to keep a pail of water within reach, and also proceeded to give a bran mash which was made of a rather sloppy consistency, figuring that he might be able to get a little nourishment and also to help as a laxative.

The stall was darkened, not admitting any light, and being in a remote end of the barn, far enough away from all noise, I figured that the patient might have a chance.

The second day I noticed hardly any change, only that the patient had partaken very sparingly, and with much effort of the bran mash and drank about $\frac{1}{4}$ pail of water.

The treatment of serum and mag. sulph. was repeated as on the first day, and every succeeding day until 12 doses of the serum had been given, but the mag. sulph. sol. was continued for 15 days in all, three days longer than the serum.

Daily attention was given to the wound such as curetting and strong antiseptic cleansing and packing.

Did not notice much change until the 4th day when to my surprise the muscles of the jaw seemed to relax.

Ordered the owner to secure some alfalfa which was in season and nearby, and handed the animal a small handful which he grasped firmly with his lips and held there until he was able to work it between his teeth.

After he worked it into his mouth he was unable to masticate it, but kept on munching and smacking for a long time before he swallowed it without having set his teeth on it. The patient from this day on kept on improving very nicely; on the 6th day he ate and masticated the alfalfa, although with effort and there were hopes

of his recovery. On about the 10th day a number of abscesses formed at the point of the injection of the mag. sulph. sol. which were promptly opened and cleansed.

(Abscesses kept on forming from later injections of mag. sulph. and in every other patient treated the same way.)

From this time on the patient did finely and after the serum for 12 days, the mag. sulph. was continued for 3 more days. All this time the patient kept on eating continuously having a ravenous appetite (i.e. after 10 days) was able to move around the stall which he seldom did, devoting most of his time to eating bran mashes and alfalfa all day long.

Plenty of fresh water was given, the same being given every 2 hours to be sure that he should not have to drink any that was warm, or full of dust or feed. An iron tonic was now given for 2 weeks in the form of a powder on the feed.

Whenever the animal showed great distress during the first 10 days potassium bromide was given in $\frac{1}{2}$ doses 4-5 times daily.

The heart, whenever it was deemed necessary, was stimulated with camphor and aromatic spts. of ammonia but no medicine was given when the patient was quiet and the heart action good.

The animal quite often showed distress after eating which was overcome with the bromide.

About a week after dismissing the case the owner called again and I then found that some of the abscesses had healed with some infection left in them which caused considerable swelling. I opened them and ordered the patient turned in pasture where he was kept for 2 months. He was put back to work and performed as well as ever.

CASE No. 2. I was called to a case the following June which had developed tetanus but could not find a wound of any kind. This was a yearling colt but for his size looked like a 2 year old full of life, though stiff when the owner brought him from the stable.

This one was able to walk with a straddling gait but when about 20 feet from the barn made a leap or attempted to leap like colts of that age are wont to do, with the result that when he struck the ground, he bounded like a rubber ball for about 100 feet on all four until he fell, almost falling on top of the owner.

He was made to rise in which we assisted, but was a nervous wreck when we got him into the box-stall away from the noise. The jaws were not set in this patient but there was considerable diffi-

culty in mastication the first 3 days, i. e. whenever I gave him something to eat on my visits.

I gave the owner the usual instructions pertaining to cold water, grass and bran mashes but on my daily visits for seven days the owner had paid very little attention to him, as it was haying season and he was too busy to bother with him. The serum and mag. sulph. were given in the same doses as case No. 1 and after a week the patient was turned into pasture, a little stiff but made a nice recovery. With this case I was at a loss to understand what cured the patient; my treatment or the want of water and feed as I am positive that he did not get enough from the owner in a week to make one meal. Anyhow I took the credit.

CASE No. 3. This was in August, 1914 at the same place where I had Case No. 1. It was a 5 year old gelding that the owner valued very highly.

The case was fully as bad as No. 1 if not worse; he was treated the same way with a nice recovery. The owner did nobly in performing his work supplying alfalfa, bran mashes and water as per orders.

It took about 4 days before the muscles of the jaw relaxed and as they were locked rather tightly, I was surprised to find him improving from then on although not as speedily as No. 1. On the 7th day the owner called me late at night and said he was afraid the horse would die. I rode out and found him panting and sweating profusely, with a fever of 106° .

I could not account for the condition except that some of the abscesses might have caused it, as the lungs were normal and no other symptoms of other trouble. I gave him 1 oz. of quinine sulph. sol. and used a rectal injection a little colder than luke-warm water (a pail full). This was about 10 o'clock at night and then left my pump with orders to again give an injection at 12 o'clock and again at 4 o'clock.

The next morning about 10 o'clock there was no sign of fever and the patient was doing well.

Both front legs of this patient were swollen twice their normal size due to the injection of mag. sulph. and remained so about 2 weeks after the last injection. I found swelling following in every case which seemed to gravitate in some patients to the fetlock joint but it gradually receded after 2 weeks from the final injection. After about 3 weeks this horse was turned to pasture, given a brief

rest and put back to work. In all he was no more that two months out of service and the owner claims does his work fully as well as before.

CASE No. 4. Called by a neighbor early one morning in September who said his horse was down with colic.

I went out and found the horse laying in the pasture unable to get up, because of tetanus.

We assisted in getting him on his feet when he also started to hop on all four feet striking the ground with all at the same time.

He bounded along for about 300 to 400 feet when he got down again and was unable to get up. I told the owner that his horse had lock-jaw but he decided to kill him as he was 25 years old, and did not want to spend the money as he was not worth it.

CASE No. 5. November 13, 1914 I received a call from a neighboring town from a butcher who said his driver was acting rather funny.

He said he was stiff all over, refused to eat and in fact was unable to reach for the feed in the feed box. From this information he had given I concluded that it was a case of tetanus, which it proved to be.

When I told the owner that the mare had tetanus he decided not to bother with her, and have her destroyed as he had never heard of any being cured, and asked me whether I did not agree with him.

I then told him of the mortality in tetanus, and also of the success I had had with the treatments I had given to other patients during a period of seven months, however, not forgetting to tell him that there were plenty of chances for the patient to die as I did not want to promise any too much on the strength of those that had made recoveries.

I was told to go ahead and try my luck as the mare was a 5 year old and valued at \$300.

I proceeded to look for a nail-prick in one of her feet, and I will say, that was the only foot I tried to examine as she was unable to stand it from the excitement caused by doing so even with the utmost care to keep her quiet by gentle manipulation of the leg.

Realizing that it was impossible to lift her feet, I decided not to excite her any more, and looked for wounds over the rest of the body, but did not find any. This mare occupied the first of 4 stalls, past which the other 3 horses had been driven going to and coming from work.

I suggested that we allot her the last stall to keep her more distant from noise.

We undertook to move her there, but found that she could not move and had to leave her where she was. Her condition was such that she could not open her mouth at all and she surely was a picture of misery.

All the muscles were rigid, having the consistency of a board; the tail curved almost at an acute angle and remained so for several weeks. The membrana nictitans was very evident, covering most of the eye-ball.

The muscles all remained rigid for over 3 weeks except the masseter muscles which relaxed gradually after 4 days of treatment. Grass being out of season, I recommended that carrots be given which were first ground up and mixed with bran and water to a sloppy consistency of which the patient partook rather sparingly for the first few days. As stated before the owner being a butcher, he had many occasions to meet his friends and customers which (contrary to my orders) he permitted to see his lock-jaw horse.

The attendant informed me almost daily that the owner had shown his mare to at least 10-20 persons every day and demonstrated to them how stiff she was by moving her from one side of the stall to the other with the effect that she would bound on her feet like a rubber ball and continued in these spasms for 5 to 10 minutes.

I had very little co-operation in this case as far as the owner was concerned as regards quietude and rest, as all the other horses were led past the patient several times a day, his continuous persistence in asking strangers to see the animal and besides allowing 2 dogs around the stable howling incessantly, although given orders to remove them. It was more indifference than contrariness in his actions in allowing the noise, and in spite of it all the animal made a splendid recovery, although more protracted than the other cases, no doubt due to excitant causes. The treatment was the same as the other cases had received, except that I gave more potassium bromide than to the others, figuring that the noise would have to be counteracted.

As stated before the muscles did not relax for some time but after 4 or 5 days the masseter muscles relaxed to such an extent that carrots could be sliced $1\frac{1}{4}$ to $1\frac{1}{2}$ inch thick and eaten that way instead of adding them to the mash ground up.

Mashes of bran were given, however, for several weeks. The

mare started to eat hay in about a week in small quantities and rather slowly requiring about 10 minutes to masticate the small amount she would prehend, and laboriously work between her teeth. When dismissing the case I gave orders to put her in a box-stall as she was doing nicely, (after about 15 days) or to exercise her daily which the owner promised to do, but instead turned her out in the yard or let her out in the street during all kinds of weather. A few days after Christmas I had occasion to go to his town and found the animal trotting around the town almost fully recovered, only a little stiffness remaining. I encountered the same trouble in abscesses forming at the point of injection of mag. sulph. but never got any fever above 102° from them. Last June the mare gave birth to a nice colt which is a picture of health. The mother is better than ever (the owner's words) and as he said, "You had to show me."

LATER CASES WHICH WERE IN THE LAST STAGES

In December, 1914, was called to a 7 year old gelding that had stepped into a piece of barbed wire and tetanus developed. When I got there I told the owner that it was useless to treat him as he was more dead than alive then, having not partaken of any feed a week previous to my visit. The owner having heard of my success with my treatment insisted on me taking a chance which I did, giving the serum and mag. sulph. that night but was called on the phone next morning and told the horse had died during the night. This animal was down when called.

In July, 1915, was called to a place where the owner told me his suckling colt about 2 months old had cramps. I went out and found the colt down with tetanus. Did not treat him as there was no chance for his recovery and in fact he died 2 hours later.

In August, 1915, called by a livery-man who told me over the phone that his horse was all stiffened up and that about 2 weeks before he had run away and slipped on the side-walk thereby breaking the skin on both knees. From this I concluded that the knees were infected as most of them get so, after such a long time and went out to treat him.

When I got to the barn I saw a typical case of tetanus with the rigid muscles, the dilated nostrils, the membrana nictitans protruding over the eye, tail curved, the straddling posture and all symptoms that accompany tetanus.

I informed him as to the condition of the horse, of which he thought very lightly as he had heard of the luck I had had in treating them, and figured that I could not lose him.

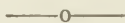
I proceeded as in the former cases in the line of treatment, with what I thought fair luck as the masseter muscles were relaxing on the 4th day when the owner told me that in his estimation the horse did not drink enough water.

I informed him that if it was within reach and if the horse was thirsty he would help himself, but the owner thought that he could not swallow, although he had swallowed mash for a day or two.

I told him not to worry and give him water every 3-4 hours so it would be fresh, but instead of doing so with a pail gave it in a pint syringe until he had the patient so excited and nervous that he got down. He called me up. I took my sling but was unable to get him back on his feet. This case was fully as bad as No. 1 but feel almost positive that he would have recovered if the water had not been given in a syringe.

He was past the stage where he would starve to death as he was eating bran mash and evidence of the muscles of the jaw relaxing. These eight cases have been treated by me within a period of 15 months and according to my judgment the treatment has been very successful (maybe lucky) in at least those cases where the animal still had a chance. Where the animals were down and in the last stages the treatment was of no value, the same as in other diseases the best of treatment and medicine was of no avail.

In conclusion will say that I have used antitetanic serum extensively as a prophylactic in nail-pricks and wire-cuts and have not had one case develop tetanus after its use.



CAESAREAN SECTION WITH REMOVAL OF ENTIRE UTERUS

WALTER M. PENDERGAST, Syracuse, N. Y.

On August 5th at 11 A. M. was called to see a Boston bull bitch that was in labor. Upon examination found one hind leg of pup presenting in the passage. At 4 P. M. no progress having been

made I gave her one ampule of pituitrin and another at 7 P. M. with no results. Efforts to extract the pup with forceps failed so at 9 A. M. August 6th I decided to perform Caesarean section.

Patient etherized, field of operation scrubbed with soap and water, shaved and painted with tincture of iodine. Incision about 3½ inches long was made through abdominal wall, and uterus exposed to view. The uterus was gangrenous and in pulling it through the incision it ruptured, so I decided to remove the entire uterus and foetus intact. Ligated the uterus with catgut just posterior to the bifurcation and removed the uterus which contained one foetus about twice the normal size. The ovaries were also removed. The abdominal muscles were closed with interrupted catgut sutures and the skin wound with interrupted silk sutures. The wound was swabbed with tincture iodine before inserting the skin sutures.

The patient had a profuse hemorrhage due probably to the fact that I neglected to ligate the ovarian arteries. On the following day the bitch appeared bright and lively and in ten days the abdominal wound was entirely healed. The bitch made a fine recovery.

Previous to this case I had operated on five bitches with only one recovery. In these five cases the uterus was sutured and returned to its normal position. In a large per cent of these cases the uterus is badly infected and lacerated and I think in such cases the removal of the entire uterus would be productive of much better results. I feel sure that the above case would not have recovered if the uterus had been returned to the abdominal cavity.

On December 15, Congressman Lobeck introduced a bill (5792) providing for the classification of salaries of veterinary inspectors, lay inspectors and clerks employed in the Bureau of Animal Industry. The bill provides that the entrance salary of veterinary inspectors shall be \$1400 with an annual increase of \$100 until a maximum of \$2400 is reached; lay inspectors (grade two), an annual increase of \$100 up to a maximum of \$1800; lay inspectors (grade one), an annual increase of \$100 up to a maximum of \$1600. Clerks of the Bureau shall receive an entrance salary of \$900 with an annual increase of \$100 per annum to a maximum of \$1500. Upon evidence satisfactory to the Secretary of Agriculture, promotions shall be made upon the efficiency and faithfulness of the employee.

ABSTRACTS FROM RECENT LITERATURE

A CONTRIBUTION TO THE STUDY OF THE CHANGES IN THE BLOOD COUNT IN DOURINE. N. Popesco, *Archiva Veterinara*.—The strict measures employed by the sanitary police to control dourine in Roumania have not given the desired results. The statistics of the veterinary service show that this disease is on the increase. In 1910, 79 cases of dourine were diagnosed, and in 1911 there were 407 cases.

The cause of the spread of this affection may be attributed, according to Popesco, to the difficulties that are met in making a diagnosis and the insidious development of the disease. The object of the present work is to find a method of early diagnosis based on the relation which exists between certain morphological and numerical changes in the blood cells and the different stages of the disease. The observations of this author were carried out on 11 dourine horses. From these investigations he drew the following conclusions:

1. In experimental or natural dourine, there are constantly found numerical morphological changes in the blood elements.

2. The leucocyte count in dourine, in general, is like that observed in other trypanosome diseases.

3. During the first days (1 to 20) following the infection by the *Trypanosoma equiperdum*, there is an increase of from 1,000,000 to 3,000,000 above the normal in the red cells.

4. Coincident with the increase in erythrocytes, normoblasts are observed and there is a hyperleucocytosis varying between 11,200 and 22,000 which persists in the majority of cases until the animal dies.

5. During the period of incubation the number of polynuclear neutrophils is increased (79 to 84 per 100) and also the eosinophiles (3 to 11 per 100), as well as other constituents: mononuclears, normoblasts, lymphocytes in stage of division and neutrophilic myelocytes.

6. In the cases of dourine of acute development the diminution of the red cells is not very marked.

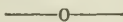
The early and certain diagnosis of dourine cannot be made by an examination of the blood constituents.

This examination, however, is susceptible of furnishing helpful data for rendering a diagnosis in doubtful cases.

(NOTE:—In this country during the past four years the Bureau of Animal Industry has made use of a modification of the comple-

ment-fixation test for diagnosing dourine and has found that this method gives highly satisfactory results. It has been possible to detect cases in the very early stages of the disease as well as in the latent forms of the affection. Judging from the results thus far obtained by this procedure, it is quite safe to predict the complete eradication of this malady in the United States in a very few years).

GILTNER.



ON THE ACTION OF VERATRUM VIRIDE WITH SOME REMARKS ON THE INTERRELATIONSHIP OF THE MEDULLARY CENTRES. William Cramer, Physiological Department, Edinburg Univ. *From the Jour. of Pharmacology and Experimental Therapeutics, Vol. VII—July, 1915—Nos. 1 and 2.*—"The use of veratrum viride has recently been strongly recommended by Dr. Haultain in the treatment of eclampsia. According to him the drug is most efficient in reducing a high blood pressure, slowing the pulse and inducing diuresis, and it was at his request that I undertook the following investigation with the object of finding, if possible, the physiological basis for its therapeutic application."

The author summarizes his experiments with the following conclusions:—

"Veratrum viride in small doses has a selective action of the afferent (pulmonary) nerve-endings of the vagus. In cats it thus produces reflexly slowing or stoppage of respiration and a fall of blood-pressure due to vaso-dilatation. As a rule there is in addition a marked slowing of the heart-beat produced reflexly through vagus-inhibition, but in cats this effect is sometimes absent. These effects of small doses are dependent on the integrity of the vagus nerves.

"The drug after having stimulated the afferent nerve-endings of the vagus, paralyzes them so that a second or third dose is without effect.

"With larger doses the drug in addition to the effects just mentioned, paralyzes the cardio-inhibitory nerve-endings of the vagus and has also a direct action on the medullary centers leading to vaso-constriction and to paralysis of respiration. These additional effects are not dependent on the integrity of the vagus nerves.

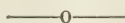
"Since large doses of the drug have so many diverse and partly antagonistic actions, the general result of a large dose of veratrum viride is very complex and irregular.

“The manner in which veratrum viride acts reflexly on the medullary centers leads to the conclusion that impulses arriving at the respiratory centre can be communicated to the vaso-motor centre and to the cardio-inhibitory centre and that a central connection exists between these medullary centres.

“The question whether veratrum viride owes its action to veratrine or to protoveratrine or to another alkaloid is discussed and left undecided. It is pointed out, however, that in the light of the present observations, the pharmacological action of veratrine and protoveratrine requires reinvestigation.

“Veratrum viride is therapeutically valuable, as in suitable doses it affords a means of producing a lasting vaso-dilatation through acting reflexly on the vaso-motor centre.”

REICHEL.



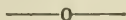
FOETAL SAC ATTACHED TO THE GASTRO-SPLENIC OMENTUM OF A RABBIT. P. Bruce White B.Sc. *Jour. Comp. Pathol. and Therap.* This case supports the view of many who consider that the so-called cases of abdominal pregnancy are due to uterine rupture with subsequent extrusion of the fetus.

On the opening of the carcass of a doe-rabbit there was found a large tumor attached by a pedicle to the gastro-splenic omentum, but otherwise free in the abdominal cavity.

Examined more attentively later, the tumor was found to have a stomach shape with greater and lesser curvature. It was attached towards one end of the lesser curvature, which measured 3.5 cm. long. The sac was 6.5 cm. long, 5.4 cm. deep and 3.5 cm. thick. With the fingers it was easily ascertained that the sac contained two bodies movable on each other. The larger occupied two-thirds of the sac and the other the remaining part. The wall of the sac was smooth and polished. An incision of the great curvature revealed a well developed fetus, covered with hair and exhibiting signs of mummification. The sac was of a fibrous texture, adherent in some places to the torn chorion, and in others to the amnion, which closely invested the fetus and contained no fluid. The well developed placenta showed no signs of attachment to the sac wall. Lying in the hollow of the back of the fetus was the second body, a large organized clot. The pedicle showed signs of torsion. The left horn of the uterus was greatly constricted about half its length

and showed unmistakable signs of a rupture. It was evident that the fetus had escaped into the abdomen through a rupture in the wall of the uterus.

LIAUTARD.



A CASE OF SYMMETRICAL ABRACHIA IN A COLT. P. Bruce White. *Jour. Comp. Path. and Therap.*—Externally the malformation was quite symmetrical, there being no trace of either of the fore limbs. The anterior ends of the scapulae protruded slightly on each side of the weak and narrow chest.

There was considerable umbilical hernia but the other external parts were normal.

On examination of the abdominal viscera, there were found several large cysts on the surface of the liver and mesentery. They contained yellowish fluid. The testes were small but remained in the abdomen.

Dissection showed no traces of the missing limbs. The glenoid cavity was quite unformed but could be ascertained with the fingers.

The whole musculature was rudimentary. The supra- and subspinatus muscles blended into a thin sheet of muscle, extending over the external face of the scapula. The subscapularis was better developed. The serratus magnus was to some extent developed as were also some parts of the pectoral muscles.

The vascular and nervous arrangement could not be made out thoroughly. The brachial plexus was undersized and the brachial nerves suddenly broke up into a brush-work.

The scapulae were the only representatives of the limbs and girdle: they were much reduced. In the left shoulder blade the glenoid and coracoid borders tapered away to a point terminated by a sharp curved process. The spine was feebly developed as a slight longitudinal ridge fading away at either end. The blade of the scapula was to a large extent cartilaginous. There could be found no traces of nodules or any structure which might be regarded as rudiments of the missing limbs or coracoid process.

LIAUTARD.

THE DOG AS A CARRIER OF PARASITES AND DISEASE. Maurice C. Hall, *U. S. Dept. Agric. Bull.* 260, Nov. 23, 1915.—This bulletin, which is intended especially for the use of physicians, veterinarians and health officers, emphasizes the fact that while a dog that is properly cared for and kept within reasonable bounds is an animal with many delightful and useful qualities; on the other hand the dog that recognizes no owner or no restraint, that carries vermin and disease, that kills sheep and destroys property—these dogs must be eliminated. Such dogs are both a nuisance and a danger.

Dogs play a part in the spread of such diseases as ringworm, favus and foot-and-mouth disease, but it is as carriers of parasites that dogs are of primary importance. The bulletin disregards the numerous parasites of the dog which are confined in all stages of their development to the dog or related animals and deals only with those parasites which are transmissible in some form to man and the domesticated animals. Of the latter group the paper deals in detail with those forms which are known from the United States and gives passing mention to those which are of minor importance or not yet known from the United States. Those known from the United States include rabies, which is, of course, still of more or less problematical etiology though commonly regarded as of a protozoan nature, hydatid, gid, cysticercosis of various forms in cattle, sheep, hogs and reindeer, tapeworm and roundworm transmissible to man, tongueworm, fleas and ticks. A discussion of the life histories, so far as known, and of the prophylactic measures, especially as they concern the dog, is given for these parasites.

It is noted that the dog is at present the subject of criticism from three quarters: public health officers are insisting on a restriction of the dog's unwarranted liberties in order to lessen and in time to eliminate the menace of rabies; sheepmen accustomed to being forced out of business by sheep-killing dogs have been taking more aggressive action looking toward eliminating worthless dogs; and parasitologists are insisting that the dog is so responsible for the spread and so essential to the existence of many important parasites that we must curtail his liberty to protect ourselves, our families and our stock from the evil results of his unrestrained wanderings.

M. C. HALL.

VETERINARY ACTIVITY IN THE WAR. Dr. J. Kostrhum, Army Veterinarian, *Tierarzth. Zentralb.*, 1915, p. 148—In an introductory remark the author describes the extraordinarily difficult problems which confront the veterinarians in the field, which require, aside from professional skill, considerable physical endurance as well as experience and a keen sense of duty. He further describes in detail a case of dystocia in the mare. The fetus was dead in dorsal position, with the head bent to the side in a way so that the fetus entered the genital organs with its neck. After great effort embryotomy had to be performed, and that with unsuitable instruments. He therefore points out the necessity of equipping the veterinarians with instruments for parturition.

A frequent occurrence among the animals was abortion, especially in the months of January and February, which resulted from mechanical irritation, irregular and abnormal methods of living, extraordinary work with subsequent rapid cooling off, especially where this occurred in a damp, cool atmosphere.

Calked wounds are very frequent, and complications develop as a result of contact with snow in the form of necrosis with an extensive and deep loss of substance. It was therefore very important to bandage the parts and rest the animals affected with such wounds.

Among the infectious diseases, glanders, influenza, scabies, pustular stomatitis and anthrax were observed. Cases of influenza occurred only sporadically, and only rarely was the disease localized in the lungs. According to Kostrhum, this was attained as a result of the individual quartering of the animals, the frequent bivouacing of doors and the frequent change of the location. The author energetically recommends the use of neosalvarsan, since it greatly reduces the period of convalescence and is therefore only apparently more expensive when compared with the symptomatic treatment.

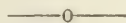
The combating of outbreaks of glanders proved very difficult. Individual cases recurred repeatedly. The measures employed in time of peace could be employed only to a limited extent. Also the insufficient disinfection of the harness, the constant changing of the horses and the use of stables which had not been disinfected were responsible factors in its propagation.

It appears that the chronic cases of glanders which remain in a latent form in the mild climate of the southern theatre of the war turn into acute cases when the animals are transferred to the more

rigid northern climate of the Carpathians, wherefore the author is inclined to accept an influence of climatic conditions upon this disease.

(NOTE:—At the present time the German army has five laboratories at the different fronts for the purpose of testing animals for glanders and other infectious diseases.)

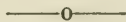
EICHHORN.



THE PREVALENCE OF FOOT-AND-MOUTH DISEASE.—(ENGLAND).
Leaflet No. 292, Board of Agriculture and Fisheries. From the Lancet—No. 18 of Vol. II—October 30, 1915.—This disease has been rather prevalent in England during the year 1914. A total of 19 outbreaks is recorded in the report of the Chief Veterinary Officer of the Board of Agriculture and Fisheries. A leaflet on the subject is therefore quite opportune, especially as the malady spreads so rapidly, and a knowledge of its symptoms, the subjects that may be affected, the nature of the infection and its carriers, is important to stock-owners, medical men, and veterinary surgeons. All the domestic animals and ruminants may be infected with foot-and-mouth disease. Human beings may contract the complaint, though they are not the most susceptible class. Cattle are the most susceptible, then come sheep, pigs and goats, and afterwards horses, dogs and cats. All suspected outbreaks of the disease are to be reported immediately to the authorities. The filterable virus to which the disease is due produces its effects usually within 48–72 hours, but the incubation period may exceptionally extend to 10 days. A high temperature—105° F. in cattle, lameness, slaverling at the mouth, and smacking of the lips are present. Lameness in a number of animals, especially if noticeable in more than one species—cattle, pigs, or sheep, for example—should arouse the gravest suspicion. The lameness may escape the casual observer, as the animals may be so footsore as to remain lying down. Slaverling is not so noticeable in pigs and sheep as cattle. The lesions consist of vesicles appearing about the mouth and on the finer parts of the skin and about the feet at the junction of skin and hoof. In milch cows the milk yield falls considerably and the lesions may appear on the teats and cause permanent injury to the udder. Very young calves may die from enteritis. The contents of the vesicles are infective, as is

also the blood in the early stages of the disease. The virus may be easily destroyed by antiseptics, but under certain conditions which exist in nature it may remain active for months and be carried long distances. Contact and cohabitation of the animals favor the spread of infection, and attendants, utensils, wind-blown saliva, foodstuffs, and water-supply may all act as spreaders of the epidemic. Roads along which affected animals have passed and wagons in which they have travelled may remain infective for some time. As showing the difficulties in the way of controlling the spread of the infection it may be noted that rats, fowls, birds, cats, horses, and dogs may act as carriers of the virus. The leaflet says that human beings may possibly convey the disease to animals. The spread of infection is very insidious. A good deal of evidence has been collected which goes to show that a human being may, through his clothes, make the clothes of others infective. Animals which have recovered may be harborers of infection for a considerable time. The commonest method of infection is through the mucous membranes by way of the alimentary canal; $1/250$ th of a drop of fluid from the vesicles is sufficient to cause infection. Personal hygiene and disinfection, control of attendants on outbreaks, confining the milk-supply to the infected place and boiling it before giving to other animals, are measures of prevention advocated. The concluding paragraphs of the leaflet draw attention to the importance of reporting the existence, or suspected existence, of the disease promptly. Great loss in stock and money and long periods of prevalence of the disease may result from inability to isolate and stamp out the disease by reason of lack of immediate notification.

REICHEL.



SCROTAL HERNIA IN A SHIRE-FOAL—STRANGULATION—RADICAL OPERATION—RECOVERY. H. Caulton Reeks, F.R.C.V.S. *Veterinary Record*.—A valuable foal showed an ordinary scrotal hernia. The owner was advised to leave it alone as it would probably disappear as the foal grew, and at any rate caution must be given the operator of its presence when castration was to be performed. Instead of following this advice, the owner bought a truss, applied it and inside of 24 hours violent colic was manifested, strangulation was plainly marked and the case seemed hopeless. However, after casting the

foal, attempts were made to reduce the hernia. They failed and the little sufferer was left to himself after receiving a full dose of castor oil and methylated ether. Directions were given to have small doses of ether given every two hours. The next day the case was still serious, showed less violence in the colic and the next morning all pain had subsided, the foal was in much better condition.

Operation was suggested and consented to by the owner. It was performed as follows: The left scrotal sac was opened and gave escape to a large amount of inflammatory fluid and the protruding intestine exposed. Attempts to reduce it failed, although there was no adhesion. Greater pressure was resorted to but no reduction was obtained. In trying to pull the intestine per rectum it was found that the fingers of the hand in the rectum could touch those of the other hand near the protruding intestine. With great care, a scalpel was used and an incision made through the inguinal ring. After this it was an easy matter to pull the intestine per rectum, and with careful manipulation return the whole into the abdominal cavity. At that moment the testicle made its appearance and was removed with the ecraseur.

During the process of reduction a portion of the intestine appeared enormously thickened, almost leather-like in consistence and with a mottled dark red and purple coloration. The wound of the abdomen was carefully attended to with antiseptics, iodine, sutures, pads, etc., and the little fellow allowed to get up, which he did in a short time and went to suck his dam. The case went on without any serious manifestation and ended with complete radical recovery.

LIAUTARD.

An important bulletin (211) for country practitioners has been published by the Agricultural Experiment Station of the Colorado Agricultural College at Fort Collins, Col., on Colorado Plants Injurious to Live Stock. The authors are Dr. G. H. Glover and W. W. Robbins. A number of the plants are doubtless common to other states and the information and suggestions will undoubtedly be useful over a wide area.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

PRESIDENT MARSHALL: Gentlemen, you have heard the very eloquent memorial with reference to our beloved Dr. Salmon. What do you wish to have done with the report?

DR. KINSLEY: Mr. President, I move that we accept it and refer it to the publication committee to be published in our proceedings, or in whatever form they are to be published hereafter.

PRESIDENT MARSHALL: You have heard the motion. Do I hear a second?

DR. MURPHEY: I second the motion.

PRESIDENT MARSHALL: The motion has been made and seconded that the report on Dr. Salmon be received and referred to the publication committee for publication in our annual report. Any remarks? If not, all in favor of the motion signify by saying "aye"; those opposed "no". The "ayes" have it. It is so ordered. A committee was appointed to attend the International Veterinary Association meeting, which committee was composed of Dr. Eichhorn, Dr. Mayo and myself (if you will pardon me for appointing myself one of the committee.) Dr. Eichhorn is present and is ready to report the findings of that committee. We will be glad to have him report at the present time.

Dr. Eichhorn read his paper "Report of the Official Tour of Europe" as follows:

REPORT OF THE OFFICIAL TOUR OF EUROPE OF THE DELEGATES OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION TO ATTEND THE INTERNATIONAL VETERINARY CON- GRESS AT LONDON, 1914.

A full report of this tour was published in monthly instalments in the *American Veterinary Review* and it is not deemed advisable to take up the descriptive phase of the tour, since this has been exhaustively treated in that publication. It is respectfully requested that the association adopt the report as published in the *American Veterinary Review* as our official report, and consider this as a supplementary report in which it is aimed to discuss briefly the veterinary education, meat inspection, sanitation, etc., as it impressed us and to point out all features which might be advantageously utilized for the welfare, progress, and standing of the veterinary profession in this country.

Professionally, our tour was an extraordinary success and we wish to express our heartiest thanks to the association, since the numerous honors and courteous attentions shown us everywhere were primarily the result of our official connection with our great association, and we also desire to show our appreciation to all those abroad who spared no effort to make our stay very profitable and interesting.

It is to be regretted that we are not in a position to report on the results of the deliberations of the Tenth International Congress, since only the opening and closing meetings were held by that great organization. The unfortunate and untimely war of the present interfered with the execution of the program of the congress and the few foreign delegates who arrived in London soon returned to their homes in answer to the return call of their countries where their services were needed.

The committee on arrangements for the congress, no doubt, did their utmost to make the Tenth International Congress a success and every one who had the privilege of being at the several functions which were held in connection with the congress was highly impressed with the elaborate preparedness of taking care of the large number of visitors expected and also to make the professional part of the congress of great interest to the participants and also of benefit to the various countries which they had the pleasure to represent. In this regard great credit is due to Sir John McFadyean and Sir Stewart Stockman, who were primarily instrumental in the arrangements for the congress. One could see on their faces the sad disappointment and no doubt they had the sympathy of every one present.

The tour which our party undertook prior to our arrival in Great Britain, however, was enjoyed by every one and gave us an opportunity to observe and visit many veterinary institutions and also to study to a small degree the sanitary organizations of the various countries in regard to veterinary problems.

The party visited the veterinary schools of Brussels, Alfort, Berne, Milan, Budapest, Vienna, Dresden, Berlin, Hanover and Utrecht. We were greatly impressed with the magnitude, equipment and thoroughness of the work in practically every school which we visited. All veterinary colleges in continental Europe are Government institutions which are maintained by regular ap-

appropriations from the representative governments. It is natural that under such conditions the schools are developed to the highest perfection.

It is not deemed advisable to take up individually the various schools since that has already been stated. With the exception of one or two, each school impressed us beyond our expectations with its thoroughness. First of all, the preliminary education required to enter at present in all of the veterinary colleges abroad is far beyond our standard, and the various representatives of the colleges informed us that only because of these requirements has the veterinary profession been elevated in these respective countries to the present high position. A high school education is required in every country of continental Europe at the present time to enter upon the study of veterinary medicine. In some institutions they even require a two-year college education in natural science prior to taking up the study of veterinary medicine. The curriculum in the veterinary colleges extends over a four-year period of 9 to 10 months each. In every college great stress is laid upon the clinical work for the benefit of the students, and in most of them ambulatory clinics are being maintained which afford an opportunity for the students to familiarize themselves with the actual work in practice, especially in bovine practice which naturally has to be neglected in the colleges located in large cities.

The spaces reserved for the colleges are located in most instances in convenient parts of the cities allowing these institutions considerable ground upon which the numerous buildings are located. In every school there are various departments, each department having its own building in which to conduct the educational as well as research work in that particular branch. Thus, the subjects of physiology, physics, and chemistry as a rule are housed as one department in special buildings; anatomy in another one; pharmacy, pharmacology and botany have also special buildings, etc. The hospitals are of modern construction and equipped with all up-to-date appliances for the treatment of various diseases. A ward for infectious diseases is isolated from the others. The same arrangement is maintained for the hospitals for small animals. The laboratories are well equipped and the students are required to do all work in histology, bacteriology and pathology, etc., in preparing specimens, sections, etc., connected with the laboratory study of these different branches.

It is aimed at the present to give the students an opportunity to study bovine diseases, and in some institutions various breeds of cattle are maintained and in one particular institution pregnant cattle are brought in for the purpose of affording the students an opportunity to study normal and abnormal parturitions.

A professor is at the head of each department having his corps of assistants assisting him in his work. This is not entirely confined to teaching and a great deal of time is devoted to research work. As a result of this arrangement most of the advancement in veterinary science has originated in veterinary schools abroad and there is a tendency to even extend the experiments and investigations in the various branches in the veterinary colleges. Of course, the teaching staff, also those engaged in research work in these schools devote all their time and attention to their respective work. The members of the faculty and their assistants devote their entire time to the welfare of the schools and the benefit of the students. The arrangement appears especially of great advantage since a professor in charge of a department makes this particular line his life work and develops his branch to the highest standard. As a result one can see in each department splendid collections of various materials which from an educational point of view are all of special advantage to the student. It is needless to point out the advantages of an arrangement of this kind in veterinary education as compared to a practice by which practitioners are charged with the teaching of various branches as is practiced in some of our institutions. The practitioner has no time to study and keep up with all phases of his subjects. Furthermore, he can devote only a small fraction of his time to the preparation of his branch and his teaching cannot be developed to such an extent as would be the case if he could devote all of his time to certain branches for the benefit of the students.

We cannot refrain from briefly mentioning the veterinary museums and libraries which are maintained in connection with every veterinary college visited. The most interesting collections, of pathological and normal specimens preserved by the most recent methods may be seen. The buildings and equipment are everything that could be desired, being equipped with the most modern appliances utilized for teaching. Roentgen apparatuses, projectoscopes, etc., are employed in most every department of the different colleges in Europe.

We must, however, consider that all the European institutions are old and developed gradually to their present standard. Nevertheless, we can do our best to learn by their experience aiming towards the highest standards for the veterinary profession in the shortest time in which it can be attained. Only through requirements of a high standard of the prospective students and through proper veterinary education can we hope to attain a standing which the veterinary profession should command.

The committee had a splendid opportunity to make comparative observations in meat inspection in the various countries and also to compare them with the meat inspection practiced in the United States. One striking feature in this regard is the control of the abattoirs and stock yards in all countries of continental Europe. They are municipal institutions erected and managed by the respective municipalities and in every respect under full control of these authorities. The expenses of maintaining these establishments are met by a fixed charge for each animal killed and accordingly most of the abattoirs are self-sustaining enterprises. With the exception of a few abattoirs we were very favorably impressed with these establishments as they are conducted abroad. It should be considered, however, that the meat industry in Europe is not comparable with the commercial features of this industry in this country, since large packing interests are unknown there and the killing is almost entirely confined either to small wholesale or to individual butchers.

We desire especially to point out the establishments of Germany which appeared to be model in the construction, sanitation and management. In France and Italy we observed that the old "cell system" of butchering was still in vogue. The inspection as practiced in the abattoirs is controlled by the rules and regulations governing the meat inspection of the respective countries or the municipalities. In Germany all animals slaughtered for consumption must be inspected and they have accordingly the control over all food animals which reach the consumer with the exception of those slaughtered for family consumption. The meat inspection system is divided in a similar manner to the one in this country, that is, into ante- and postmortem inspection. Veterinarians employed by the municipalities are in charge of the inspection which from our observations is very thoroughly carried out in all abattoirs we visited in Germany. In some of the other countries we observed a laxity in the inspec-

tion, in one particular instance the veterinarians only passing up and down the aisles without giving the individual carcasses the necessary inspection. The regulations governing the meat inspection vary to some extent in the different countries but the differences are not very striking and are very much the same as those governing the Federal meat inspection in the United States. In this regard it may be mentioned that in the disposition of the carcasses affected with certain diseases the regulations in Europe are much milder than in the United States. In connection with the abattoirs they maintain so-called sanitary abattoirs in which all the condemned and retained carcasses are finally disposed of. A laboratory is also maintained in the sanitary abattoirs for bacteriological meat inspection. The sterilization of the meat which has been conditionally passed is also done in this building, special sterilizers being provided. The meat is cut up into certain sized pieces, placed in baskets and these baskets then shoved into the sterilizers where the sterilization is accomplished under steam pressure. Such meat must be sold under declaration in special shops known as Freibanks.

Some of the abattoirs visited were very impressive in their construction. Architecturally they appeared neat. From a sanitary point of view they possessed everything that could be desired. In the more modern establishments such as are in Dresden the construction was carried out on a very elaborate scale including labor-saving appliances. The large killing halls are so constructed that the buildings are provided with ample light and air and the entire establishment might be considered free from odor; even in the tripe room one is impressed with the absence of disagreeable odors.

Similar arrangements could not be expected in the establishments of this country on account of the variance in the commercial end of the industry. One could readily see everywhere that the meat inspection in this country is at least as efficient as in any European country and the food passed under our method of inspection is assurance to the people of its wholesomeness.

The veterinary service of the different countries could be only satisfactorily discussed by an elaborate description which would take too much space for a brief report of this kind. The sanitary regulations relative to the control of infectious diseases vary considerably in the different countries and one might favorably compare them with the existing conditions in the different states of our country. The least attention is paid to the control of tuberculosis. There is

no concerted effort in Europe towards the control of the disease by legislative measures. In some countries the governments are aiding in their efforts to eradicate the disease from their herds but compulsory measures do not exist in this regard. The compulsory tuberculin test is unknown and no attention is paid to the milk supply with regard to tuberculosis. No control is exerted over traffic with tuberculous animals and a man knowing of this disease in his herd will not hesitate to dispose of affected animals to the best advantage; he will even sell such animals to his neighbor. A great deal more attention is accorded to the control of glanders. In some of the countries which we visited the authorities have successfully eradicated the disease with the aid of stringent measures enforced by government officials. In this regard probably Austria attained the best results within the shortest time since the acceptance of the eye test for the diagnosis of glanders and by the inauguration of other measures for the control of the disease in stables where it appeared they succeeded in eradicating glanders in most of the provinces of Austria. Prussia has also attained similar good results, but the complement-fixation test has been used instead of the eye test. Rabies is being controlled in the various countries by muzzling orders which are strictly enforced, and as a result of this the disease has been practically eradicated from most of the countries which we visited. Compulsory reporting of outbreaks of various other diseases and subsequent strict quarantines are required in most infectious diseases, and thereby the sanitary authorities are always in position to establish the extent of the respective diseases in the different countries.

The veterinary organizations and the methods of control of various diseases as practiced in the different countries have been more fully treated in the general report of the committee.

The failure of the last congress which was to have been held in London, as a result of the European conflict, is to be greatly regretted since various problems were to have been exhaustively treated on that occasion and no doubt all countries would have greatly profited by the resolutions which would have been adopted as a result of the earnest deliberations which are characteristic of the veterinary international congresses. At the present time it is difficult to foresee the time when it will be possible to hold the next congress but it appears that it is not too early for our association to consider the possibility of inviting the next congress to this country.

The neutrality which has been maintained by this country throughout the European conflict would no doubt assure the veterinarians of all nations a hearty welcome. An official invitation from our association in due time will further assure our professional brethren abroad of a successful meeting. The benefit which the veterinarians of this country would derive from such a meeting and the advantages to the country would justify a thorough preparedness and an early consideration of an earnest appeal to the permanent committees of the International Veterinary Congress to decide upon the place of the next meeting in the United States. Such an invitation could be issued as soon as the war clouds disappear and after the restoration of the much desired peace, when each one will return to his former occupation working for the welfare and benefit of humanity.

DR. EICHHORN: Mr. President and Gentlemen: We were treated with the utmost courtesy by the different countries we visited officially and privately, and, no doubt, a great measure of this is due to the fact that the association granted us the privilege of representing it officially during our tour, and for this reason, Mr. President, I move that the association extend a vote of thanks to all those who aided us in our successful trip, and that we express our gratitude for the kind reception we were accorded at every place we visited. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: Gentlemen, I can heartily endorse everything that Dr. Eichhorn has said with reference to the courteous reception given us while we were abroad. What do you wish to do with the report Dr. Eichhorn has presented?

DR. KINSLEY: I move that the report be received. Seconded.

PRESIDENT MARSHALL: It has been moved and seconded that the report of Dr. Eichhorn be received and referred to the publication committee. If there are no objections, it is so ordered. Now, gentlemen, a motion has been made by Dr. Eichhorn.

DR. HOSKINS: I move the adoption of the motion and a vote of thanks be extended to the people who assisted in making the tour of our committee so successful.

PRESIDENT MARSHALL: It has been moved and seconded that this association extend a vote of thanks to those who made our trip so pleasant and contributed in many ways to the pleasure of the tour. Any remarks? If not, it is so ordered. There are a few suggestions contained in Dr. Eichhorn's report, which I think the association should act upon. One is particularly in reference to this association extending an invitation to the International Congress to meet in America at its next meeting.

DR. HOSKINS: I move that the recommendation be referred to the executive committee to be acted upon as the committee shall see fit. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: It has been moved and seconded that the question of extending an invitation to the International Congress be referred to the executive committee and that they make a recommendation to the association for action. Any remarks? If not, it is so ordered.

It is now a little past eleven o'clock which was the time appointed for the report of the reorganization committee. Is the committee ready to report?

DR. RUTHERFORD: Mr. President, pardon me a moment, I want to ask one question of Dr. Eichhorn with reference to education. Is it in order to ask it now?

PRESIDENT MARSHALL: I think it would be in order at this time.

DR. RUTHERFORD: My question refers to what you said in regard to a high school education in many of your colleges. Does a high school education in Europe mean more than our high school education, in other words, is there a higher standard there than in our high schools? As I understand it, they do not have high schools such as we have. Am I right or wrong?

DR. EICHHORN: I am not ready to discuss the difference between the education in this country and abroad, but it requires the same number of years to go through the gymnasium, as they call it, or the high school. In Europe they have four years public school and eight years gymnasium, or high school, and in this country we have eight years public school and four years of high school.

PRESIDENT MARSHALL: Is the committee on reorganization ready to report?

DR. CAMPBELL: I do not understand it is. The report was put in the hands of the executive committee with instructions to report back to us at this time, but I understand it is not yet ready.

PRESIDENT MARSHALL: As I understand the proposition, as it stands at present, the executive committee is not yet ready to report. They ask for more time for consideration.

DR. CAMPBELL: I wonder if they would not be willing to set a definite time to make that report so that we will all know when the matter of reorganization will come up so that we may be present to take part in the discussion.

DR. JENSEN: Mr. Chairman, I believe that the executive committee could make that report tomorrow afternoon at the time appointed for the completion of business just before the election of officers, if that is agreeable.

PRESIDENT MARSHALL: You mean tomorrow afternoon?

DR. JENSEN: Tomorrow afternoon before the election of officers.

PRESIDENT MARSHALL: If you mean Thursday afternoon, all we have left is the election of officers and there probably would be a good attendance of the members at that time, and it would possibly be advisable to postpone the matter until Thursday evening at the time of the election of officers.

DR. CAMPBELL: In this connection I want to remind the executive committee and members of the association that the report of the committee on reorganization was made in that very way two years ago, on the last day of the session, and the last session of that day, there was not an opportunity to consider it at that time. It is possible the association might wish to send this back to the executive committee for some minor changes; it is quite probable they

would wish to do so, and it seems to me, it is advisable to have this subject up for consideration one day in advance of the last meeting of the session. In this way the matter may be reported back to the executive committee and time allowed to make whatever revisions the committee may see fit to make before referring back to the association.

PRESIDENT MARSHALL: Tomorrow morning at nine-thirty we have another business session and it is rather short and if agreeable to the members of the association we can bring the matter of reorganization up for consideration at the session tomorrow morning, if that will be agreeable to Dr. Campbell.

DR. CAMPBELL: Yes.

PRESIDENT MARSHALL: Then the report of the committee on reorganization will come up tomorrow morning at ten o'clock instead of nine-thirty. I am sure we will have sufficient time if we begin our meeting at ten o'clock in the morning instead of nine-thirty as scheduled at the previous meeting. There are three or four reports for tomorrow morning in addition, which have not been called at present and there is one other report on the program for today and that is the report of the committee on necrology. Are you ready to make that report, Dr. Campbell?

DR. CAMPBELL: I am waiting for certain information and the report is not yet ready but it will take less than five minutes to get the report ready when I get the information desired and I would rather have some time to complete the report. Will there not be time to get that report tomorrow morning? It will be ready at that time.

PRESIDENT MARSHALL: We will hear your report tomorrow, Dr. Campbell. The report of the committee on advertisements of veterinary remedies by Dr. G. H. Glover, chairman, was listed for tomorrow but Dr. Lyman is here and will make the report now, if you so desire.

DR. R. P. LYMAN: Gentlemen, this report I find in my mail upon arrival here and as it is written by our chairman Dr. George H. Glover, I will simply read the report of the committee as presented by him. I will say that the committee has done a large amount of work by correspondence with the publishers of many papers carrying advertisements and so on.

Dr. Lyman then read the report of the committee on advertisements of veterinary remedies as prepared by George H. Glover, Chairman, as follows:

REPORT OF THE COMMITTEE ON ADVERTISEMENTS OF VETERINARY REMEDIES

GEO. H. GLOVER, Chairman

JOSEPH HUGHES

R. P. LYMAN

Mr. President and Members of the Association:

The work of your committee has consisted largely in close inspection of the advertising columns of agricultural and livestock papers, and calling the attention of the owners or managers to those

advertisements which are considered objectionable, and asking them to discontinue the same.

A lawyer was first consulted for advice as to just how far we could go in denouncing specific fake "cures", without making us personally liable in a suit at law. I was informed that, in substance, we had better "make haste slowly", and while we might express a doubt, and make manifest a disapproval of certain advertised "cures", we must openly brand them as fakes, unless we are prepared to prove the truth of our assertion. The burden of truth resting with the one who dares to publicly denounce an apparent fraud, seems to reverse the order of justice and in this instance places your committee in a dilemma.

Many letters have been written to editors and managers of newspapers, and many arguments have been used to induce them to reject certain questionable advertisements. We have succeeded in some instances and failed in others. Some of these advertisements are so glaringly fraudulent, that it seems like questioning a man's intelligence to assume that he approves of them. A copy of the first letter which was sent to the leading agricultural and livestock papers is as follows:

"Dear Sir:

As chairman of the committee appointed by the American Veterinary Medical Association on advertisements of veterinary remedies, I wish to call your attention to certain advertisements which are being carried in some of the agricultural and livestock papers relative to "cures" for various animal diseases. The very illuminating and deceptive character of some of these advertisements, must be apparent to anyone who will take the time to read them carefully.

Several newspaper editors have sought the co-operation of this committee in helping them to make their papers more valuable by pointing out those advertisements which are looked upon as deceptive or fraudulent, and I wish to assure you that this committee will be glad to work with you to this end. We will be glad to offer technical assistance in deciding as to what may be considered proper claims for veterinary remedies. This committee assumes that you are anxious to make your paper perfectly reliable in everything that it publishes, and that you would not knowingly accept an advertisement that is not square with your subscribers.

We have not as yet looked especially into the character of advertisements which appear in the columns of your paper, but we have found some that are objectionable in many other papers. In the interest of a square deal for the thousands of readers of these

papers, we are anxious to see these fake advertisements for veterinary remedies curtailed and eventually entirely suppressed.

Respectfully”.

The replies received, were on the whole not very encouraging. Many of these letters were never answered. A very few informed us that they would discontinue any advertisements that we thought objectionable. A few asked us later to point out certain advertisements in question and to “show them” why they were considered objectionable. Some of the replies were decidedly caustic, and inferred that we were actuated by ulterior motives and in substance, that they would exercise their own judgment in the matter of accepting advertisements for their paper.

The revenue from advertisements is an important asset to a newspaper and most editors cannot be reached by an appeal to medical ethics. As to the question of honesty with their subscribers they invariably come back with the argument that the claims made for these remedies may be substantiated, they have no proof to the contrary.

Your committee is of the opinion that very little can be accomplished by mere appeal to editors to discontinue certain advertisements which this committee considers objectionable. Convincing proof of the real merit, or absence of it, must be produced in each instance, by actual experiment in the hands of recognized authorities and the results published to the world.

It is the opinion of your committee that the best way to handle this situation is for the United States Department of Agriculture at Washington or State Experiment Stations, State Boards of Health, Pure Food Officials, or others whose authority cannot be questioned, to make analyses, and if deemed necessary to co-operate with prominent veterinarians in testing these remedies and that the results be published. It is our opinion that this committee might be far more useful by centering their efforts in the line of promoting the actual investigation of the most conspicuous of the long list of proprietary remedies through some of the agencies mentioned, rather than criticising newspaper editors and engendering their ill will and opposition.

The campaign of education should go on with renewed vigor but our efforts should be centered in exposing these miraculous cures one by one and your committee feels that in this way some tangible evidence of good accomplished can be reported at our an-

nual meetings. We have several instances recently where fake remedies have been suppressed in this way.

We would recommend that this committee be continued, but that its work in the future be directed more to seeking the co-operation of recognized authorities in actual investigation of fake remedies and in publishing the results.

DR. KINSLEY: I move that the report be accepted and referred to the publication committee.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion. Any remarks on the motion?

DR. MAYO: Mr. Chairman, I have been especially interested in this question and I heartily approve of the suggestions made by the committee, that is the plan that has been adopted by the American Medical Association, that is, of analyzing and publishing the results of the analysis of these wonderful cures and I believe that much good can be done in connection with the Bureau of Animal Industry and statistics. I would also say in this connection that a matter came to my attention, which probably ought to be brought before the members of this association. There was started over a year ago, a Correspondence Veterinary School that was known as the Northwestern Veterinary College, somewhere in Minnesota or Dakota. They nominally had their headquarters in Minneapolis but Dr. Reynolds who investigated this affair was unable to find any thing more than a post office there. Their literature was formerly sent out from Aberdeen, South Dakota.

It was called to my attention in this way. A physician wrote to me, sending me copies of their literature and saying that the head of the concern was a member of this association. I am happy to say he is not. His name was Krutner. He was a graduate, but not a member of this association. I took the matter up with the various journals who were carrying their advertisements and at my request, they stopped it.

I took the matter up with the post office authorities and showed them that they were not a veterinary college. They carried the names of Dr. V. A. Moore, Dr. W. L. Williams, Dr. A. H. Baker, Dr. Hobday, and several others in such a way as to make it appear they were members of the faculty, although if you read it carefully you would find that that was not the statement made. It was one of the most convincing, wide-awake, and misleading propositions I ever looked over, but finally after referring the matter to the post office authorities, the Northwestern Veterinary College sent out a notice to their patrons that owing to war conditions they had reached the limit of their finances.

DR. HOSKINS: Dr. Mayo has referred to a matter concerning which I was going to ask a question of Dr. Lyman.

I would like to know under what conditions the American Medical Association makes these investigations and analyses. I know that they do in the *American World*, published in Philadelphia, very openly and frankly score pretty nearly all these fake remedies, giving their analyses and so forth, as given by the American Medical Association. They do this openly. They don't seem to fear any prosecution by these fellows.

DR. MAYO: I can say in answer to Dr. Hoskin's inquiry that the American Medical Association have their scientific staff to make these analyses. They are not without their troubles, however. They are spending amounts aggregating hundreds of thousands of dollars with reference to this very proposition and that is the reason why I suggested that we depend upon the analysis of the Bureau of Animal Industry of the United States Department of Agriculture. It would relieve the association of considerable responsibility in some ways, if we could get the government to assume that task.

DR. HOSKINS: It seems to me the Post Office Department ought to refrain from distributing these fake advertisements.

PRESIDENT MARSHALL: Any further remarks? If not, all those in favor of referring the report of this committee to the publication committee, so signify by saying, "aye." Opposed, by the same sign; it is so ordered.

I understand the report of the special committee on veterinary anatomical nomenclature is ready. Is Dr. Newsom here?

DR. NEWSOM: There was just a supplemental report we signed. I would suggest that it be read now. I do not suppose you want us to read this long report containing many scientific names unless Dr. Mayo wants to read it. There were a couple of pages in explanation which were sent to me by the chairman, Dr. Sisson, and it was signed by all the members of the committee. It would only take about five minutes to read it.

DR. HOSKINS: I move that Dr. Newsom read that part of the committee's report.

DR. MAYO: It is upstairs and I will get it.

PRESIDENT MARSHALL: Until Dr. Mayo can locate this report, we will call upon some other committee. Is the report of the special committee on the agricultural college investigation ready? Is Dr. Farrington here? If not, the secretary can read the report.

REPORT OF COMMITTEE ON VETERINARY EDUCATION IN AGRICULTURAL COLLEGES

At the forty-ninth annual meeting of the American Veterinary Medical Association held in Indianapolis, Indiana, in 1912, the following preamble and resolution was passed:

"Whereas, The veterinary instruction given in Agricultural colleges to students pursuing the four-year agricultural courses varies materially in the several agricultural colleges, and

Whereas, Graduates of agricultural colleges may receive one-year time credit in veterinary colleges, accredited by this association, providing said graduates in agriculture have had sufficient veterinary science; be it

Resolved, That the president appoint a committee of three to outline such sufficient veterinary science,

and to recommend to agricultural colleges the extent and scope of veterinary science which this association believes should be included in such agricultural courses.”

Former President Mohler appointed as the committee of three called for in this resolution, Dr. Paul Fischer, State Veterinarian, Columbus, Ohio; Dr. James B. Paige, Veterinarian to the State Experiment Station and Agricultural College, Amherst, Massachusetts; and Dr. A. M. Farrington, at that time Assistant Chief of Bureau of Animal Industry, Washington, D. C. This committee was unable to meet for a conference but by correspondence began an inquiry to ascertain the character and amount of veterinary instruction which was given to agricultural students at the several agricultural colleges of the United States. This was no small task, and as indicated in the preamble it was found to vary materially in the different agricultural colleges extending from some colleges which make no mention even of veterinary science in the curriculum to the other extreme where three or four veterinarians were employed in teaching and were provided with an extensive equipment which might well be the envy of some veterinary colleges. Because of these variations in the amount of veterinary instruction the committee considered that the problem given them was to outline a plan by which veterinary colleges can determine how much credit in veterinary science can be given to graduates of four-year agricultural colleges who wish to take up the study of veterinary medicine in a veterinary college. Since it seems impracticable to bring about a uniformity in the courses of instruction because of differing local conditions and different demands upon the colleges, your committee after looking into the matter decided that the only advisable method was to admit agricultural graduates to accredited veterinary colleges on the certificate plan which is that each applicant should be admitted on a certificate signed by the proper college authorities setting forth in detail the scope and kind of studies which he has passed successfully. On this basis he was to be admitted and given such advanced standing as seemed to be indicated by his scholarship.

The committee submitted a report to this effect to the fiftieth annual meeting of the association (see page 245 of the proceedings of that meeting). In the discussion which followed the report was characterized as disappointing and not what was desired. The idea of those persons who drafted the resolution was to prepare a guide

to those teaching agricultural students and not a guide to those conducting a veterinary college. President Marshall accordingly re-appointed the same committee with instructions to again attack the problem and bring in a report which shall recommend the extent and scope of a course in veterinary science at agricultural colleges. At first sight it appeared to be almost a hopeless undertaking to expect agricultural colleges to adopt a uniform course, as conditions differ so widely in states where these colleges are located. However, it may be helpful for this association to adopt a standard course for agricultural students and the several colleges may work towards such standards gradually from year to year as changes are made in the personnel of the teachers and demands for instruction. Such a course may have a similar effect on veterinary education as the now famous course promulgated by the Government commission on veterinary education as printed in Bureau of Animal Industry circular 150. Your committee has devoted much time and thought to this matter and has received the co-operation of twenty-five or more veterinarians now engaged in teaching veterinary science in agricultural colleges and as a result of our labors we beg to submit the recommendations as given at the end of this report. Some words of explanation may be necessary in this connection.

In the first place it seems advisable that each agricultural college should employ at least one veterinarian who shall devote his entire time to teaching veterinary subjects or if the classes are small he may devote a portion of his time to experimental station work. It has been suggested that at some small colleges it will be necessary for the veterinarian employed to earn a part of his salary by outside practice. But the veterinary department of an agricultural college should be important enough, and of sufficient consequence, to command the time of a competent veterinarian without it being necessary for him to do outside work or practice his profession to earn a portion of his livelihood.

In the second place one objection to the course as recommended is that the amount of teaching is more than can possibly be accomplished at the smaller colleges and while this may be true to some extent the ideal should be in advance of what can be easily accomplished, and the greater number of preliminary studies the student has pursued will give him a firmer grasp of the instruction to be given later. These preparatory studies can easily be covered in the ordinary high school or other preliminary instruction. In one

agricultural college one requirement to enter the veterinary department is a reading knowledge of a foreign language in addition to high school graduation and upper division studies which makes the entrance requirements of this institution higher than any veterinary college in the United States.

In the third place the majority of agricultural colleges are provided with well-equipped departments of animal husbandry which far exceed the equipment of the veterinary department and while there is no objection to good instruction in animal husbandry, especially in some states where live stock raising is a leading industry, yet this should be a pre-requisite to the study of veterinary science and not allowed to exceed it in importance.

In the fourth place it seems advisable that considerable time should be devoted to the study of anatomy, not in a technical way as at a veterinary college, but for the purpose of becoming more familiar with the specimens of animal life that the successful stock-man is to raise on his farm, this instruction to begin with the foundation, the bones, and then lead on to a general understanding of the superstructure of the animal. One teacher in this line recommends that special stress be placed on the study of the skeleton as it seems to help the student during his first-year in college more than any other branch of anatomy. It is quite as essential for a veterinarian to insist on this knowledge as for an animal husbandman to require a knowledge of the color, markings, characteristics, etc. of the farm animals which he describes in his teachings. In teaching veterinary anatomy it is not imperative that the carcass of the horse should be secured, treated with preservatives and systematically dissected as at a veterinary college, but small animals such as a rabbit, dog or cat can be used to demonstrate the organs and gross structures as preliminary to further instructions. At one college the dissection is confined to the rapid dissection of the horse carcass and the observation of cattle, sheep and hog viscera at an abattoir. However, if laboratory facilities can be provided so that each student can dissect a small animal it will greatly add to the interest in the subject and will impart a general knowledge of gross anatomy sufficient for the ordinary live stock grower. In some agricultural colleges instruction is given to agricultural students in histology but this does not seem advisable unless the college is giving a pre-veterinary course which is different and distinct from the ordinary instruction to agricultural students.

In the fifth place it seems advisable that the function of the organs of the living animal should be taught since it is important to know the framework of the animal it is also highly important to know the uses of the organs within that framework. This is embraced in the study of physiology. One teacher who is allowed a short period only for instruction states that he gives anatomy and physiology during the same course of lectures as he believes that agricultural students who have rather limited time for this work can more easily correlate structure and function if they are taken up together.

In the sixth place all will admit the importance of extensive knowledge of the reproduction of farm animals, together with the hygiene of pregnant animals and the care of the new born. Some teachers recommend that embryology be also taught in this connection, and while this may be advisable when there is a sufficient number of hours of instruction available, yet it is not essential for the ordinary agricultural student.

In the seventh place it is generally admitted that instruction is needed in the common or sporadic diseases of live stock, especially those due to improper care and handling. The dominant idea of all veterinary instruction to agricultural students should be the importance of prevention of disease rather than ability to cure disease after it has once been established. Along with the instruction in prevention of disease some time should be devoted to the common remedies which may be used. In some colleges this is taught under the heading of materia medica and therapeutics but it is believed that these subjects should not be included as such in the curriculum for agricultural students but should be preserved for the strictly veterinary college.

In the eighth place it is found that there is a wide variation of opinion regarding the teaching of clinics or practical laboratory work at the agricultural college. If it is true as stated by one teacher that 50% of all the agricultural students in agricultural colleges today come from cities or large towns and have had little or no experience in handling animals it is important that practical instruction in this line be given especially in harnessing, hitching, driving and handling of horses. If this work is not taken up by the animal husbandman practical demonstrations in this line should be given. The tendency is for this teaching to develop into a regular veterinary clinic which is not desired and is usually a waste of

time. One difficulty about this matter is that a variety of suitable cases is very limited but so long as the instruction can be confined to such cases as the well-educated stockman ought to know the effect is satisfactory but when it comes to performing operations such as neurectomies, operations for roaring, or attempts to prescribe for cases of pneumonia or similar complicated diseases the time of the student could be more profitably used elsewhere.

In the ninth place it seems advisable to add that if the course of study is so much crowded that there is no time to cover the whole field of animal plagues the instruction may be confined to the more common infectious diseases which the ordinary farmer is likely to meet with. At one college the veterinarian states that his main work as far as veterinary teaching is concerned is to dwell strongly on prevention, sanitation, better farm management, and instruction concerning the treatment of simple and emergency cases in a proper manner and to carry on the work of the veterinary department in a way that the agricultural graduates will have the highest respect for intelligent expert veterinary service and to know when they are receiving it. The amount of veterinary pathology given in this connection should be very meagre and in fact confined to the merest outline sufficient to cover the subjects.

In the tenth place it is advisable that agricultural students should be taught the truth that the employment of a well-qualified veterinarian is necessary for the treatment of diseases of live stock and that such a veterinarian is an economic asset to every agricultural community. It is asserted by one teacher that a farmer can not be his own veterinarian any more successfully than he can be his own physician, the only difference being that in one case it is usually a monetary consideration and in the other a human life is involved, and that as soon as an abnormal condition exists or there is a diseased process established, that the best advice and assistance should be called.

As stated in the beginning of this report it is very difficult to establish a course which will be satisfactory under all conditions. In general it may be said that it is not well to give the students an opportunity to "specialize" in veterinary science because if they do that they are apt to consider that they are qualified to engage in general practice. To do this they should attend a regular veterinary college.

(To be continued)

SOCIETY MEETINGS

The Sixth Semi-Annual Meeting of the Central New York Veterinary Medical Association was held at Syracuse, New York, on November 23rd, 1915, with the following members present:

H. A. Turner, A. J. Tuxill, W. L. Clark, M. W. Sullivan, L. G. Moore, A. E. Merry, F. E. York, E. E. Dooling, J. C. Stevens, W. B. Switzer, J. G. Hill, R. C. Hurlbert, J. M. Currie, W. M. Pendergast, J. H. Hewitt, J. A. Pendergast, Frank Morrow, J. V. Townsend, J. K. Bosshart, A. L. Danforth.

Visitors: Dr. D. H. Udall, of the New York State Veterinary College, Ithaca, N. Y., and Mr. MacClary.

Preceding the business session a clinic was held at the infirmary of Dr. H. A. Turner at 938 South Salina Street, occupying the hours from 10:00 A. M. to 1:00 P. M. The subjects were:

Case I. Brown gelding: Median neurotomy: Dr. H. A. Turner, surgeon.

Case II. Black gelding: Trephining and extracting tooth: Drs. J. A. Pendergast and J. G. Hill, surgeons.

Case III. Gray gelding: Firing spavin: Drs. W. L. Clark and J. V. Townsend, surgeons.

Case IV. Grade Holstein bull: Demonstration of physical examination of cattle: Prof. D. H. Udall, demonstrator.

Case V. Bay mare: Median neurotomy: Drs. H. A. Turner and Frank Morrow, surgeons.

Following a lunch at the infirmary, the members adjourned to the Saint Cloud Hotel, where the business session was called to order by Dr. Frank Morrow, Vice-president: Dr. E. E. Dooling, President having been called away. The usual routine business was conducted. The death of Dr. J. S. Elliott, of Clinton, N. Y., a member of the association, was reported and the secretary was directed to send a letter of condolence to the family and to inscribe same on the minute book of the association.

The matter of illegal practice was discussed and a resolution adopted constituting the members a committee of the whole to report illegal practitioners to the secretary who was authorized and directed to forward any such reports to the attorney-general's office for attention, urging prompt action. The advisability of publishing the names of illegal practitioners in the newspapers was also discussed and laid on the table pending an investigation as to the legality of such action.

The program consisted of the following addresses, papers and case reports:

Address: "Veterinary Education"—Dr. D. H. Udall, New York State Veterinary College, Ithaca, New York.

Paper: "Foreign Bodies in the Stomach"—Dr. J. M. Currie, Rome, New York.

Paper: "Meat and Milk Inspection and Its Effect in the City of Syracuse"—Dr. A. E. Merry, Syracuse, New York.

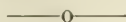
Case Reports: "Unusual Digestive Trouble in Cattle"; "Rupture of the Diaphragm with Recovery" (subject at clinic for examination); "Caesarean Section with the Removal of the Entire Uterus of Bitch with Good Recovery"—Dr. W. M. Pendergast, Syracuse, New York.

Case Report: "A Peculiar Case of Azoturia with Great Amount of Sloughing at the Shoulders"—Dr. Frank Morrow, Rome, New York.

A full discussion was had upon all of the matters thus presented. A unanimous vote of thanks was extended to Dr. Udall for attending the meeting and contributing to the program.

At 5:30 P. M. the meeting adjourned and was followed by a dinner at the St. Cloud Hotel which was well attended.

(Signed) W. B. SWITZER, Secretary.



BUREAU OF ANIMAL INDUSTRY EMPLOYEES

Digest of Proceedings of Joint Conference of Representatives of National Assn. Bureau of Animal Industry Employees and Representatives of the Bureau of Animal Industry Meat Inspectors National Assn. held in room 802 Live Stock Exch. Bldg., Kansas City, Mo., Sept. 26, 1915.

The members of this Conference were appointed by the executive committees of their respective associations to attend.

The following B. A. I. Employees were in attendance at the Joint Conference:

Representatives of N. A. B. of A. I. E.:

Drs. Rohrer and Curry; Mr. Stephen Bray, (L. I. Gr. No. 1) and Mr. Jas. T. Sandy (L. I. Gr. No. 2).

Representatives of B. A. I. M. I. N. A.:

Messrs. Stevens, Greene, Goodman, Stratton and Whalin. (Lay Inspectors Grade No. 2).

On motions, Messrs. Bray and Whalin were elected Chairman and Secretary, respectively, of the Conference Committee.

Mr. Stevens expressed the desire and willingness of the M. I. Natl. Assn. to co-operate with the N. A. B. of A. I. E. in securing a salary classification bill which would be just and equitable to all classes.

Motion carried that the Conference recommend to the Nat. Secretaries of each of the National Assns. that they instruct the local secretaries to call mass meetings of all B. A. I. Employees, regardless of class, grade or affiliations for the purpose of discussing and adopting or rejecting, the recommendations hereinafter recorded. That at stations where two separate organizations exist the secretaries of each organization shall issue call for said meeting jointly and that the Chairman, Secy. and other officers at said meetings should be other than the present officers of either association, and that the National Officers be guided in their efforts by the preponderance of sentiment thus ascertained

Motions carried that the following salary schedules be recommended:

	Minimum	Maximum
Veterinary Inspectors	\$1400	\$2400 per annum
Lay Inspectors Grade 2	1200	1800 per annum
Lay Inspectors Grade 1	900	1600 per annum
Clerks	900	1600 per annum

Above maximums to be attained through annual increases of \$100.

Motions carried showing that it was the sense of the committee in conference that the introduction of a bill embodying the schedules herein suggested is desirable, that its provisions are fair, just and equitable, that it should be endorsed by all B. A. I. Employees, regardless of class or organization affiliations and that every legitimate means should be used to promote its final passage. Motion unanimously carried that the conference recommend to all B. A. I. Employees that whatever schedules were finally adopted and presented to Congress should be enthusiastically supported by all.

Motion carried that the conference suggest that in all cases the clause "All other promotions to be made at the discretion of the Secretary of Agriculture" be substituted for the clause "Further increase in salary to be made at the discretion of the Secretary of Agriculture". It was held that such a clause would give the Secretary greater discretionary powers in his selection of men from the ranks for special duties. It was also maintained that efficiency should stand an equal show with seniority.

Motion carried that the good will and harmony manifested throughout this conference demonstrate its success and forecast good results for all parties concerned. The committee recommends that frequent conferences of a similar character be held in the future, to the end that harmony and unity of action may be obtained in promoting the interests of all B. A. I. Employees.

Conference adjourned *sine die*.

STEPHEN BRAY, *Chairman*.

C. V. WHALIN, *Secretary*.

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Report of Committee on Resolutions of the North Eastern Indiana Veterinary Association, appointed by A. Buckmaster, President, at a called meeting November 29th, 1915.

OBITUARY

Dr. William Frederick Myers was born in Fort Wayne, Indiana, Nov. 15th, 1864, and died in St. Joseph Hospital, Nov. 27th, 1915, from a gun shot wound received while hunting on Thanksgiving day, and was buried from the "old home" in which he was born, Nov. 29th, 1915.

He graduated from the Chicago Veterinary College in the Class of '89 and immediately entered into and continued in practice in Fort Wayne, Ind., until his death.

He was a member of the American Veterinary Medical Association, the Indiana Veterinary Medical Association, the North Eastern Indiana Veterinary Association, and at the time of his death was President of the State Board of Veterinary Medical Examiners.

He was an ardent sportsman and especially was he a skilled fisherman and it was his delight to bring in the first catch of bass in the early spring. He had an old fashioned cottage, "The Old Kentucky Home," (on the very brink of Lake Barbee), whose walls, floor and ceiling were covered with relics and skins, and it was his great delight to entertain visitors, giving the history of each article, and if none existed, he would manufacture one, that would make the hearers gasp for breath. He had a genial disposition, a kind word and a sunny smile for every one, and best of all a heart as tender as a girl's. It was the privilege of the writer of this sketch to be one of his intimate friends, and no one feels his loss more keenly.

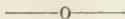
WHEREAS, It has pleased the Almighty in His infinite wisdom to remove from our midst our beloved friend and brother, Dr.

William F. Myers, it is fit and proper that this association should record its feeling of grief, therefore be it

RESOLVED, That in the death of our friend and brother, this association mourns the loss of a valued member, and be it further

RESOLVED, That we extend to the family, our heartfelt sympathy in this our common bereavement, and that a copy of these resolutions be spread on the records of this association.

A. H. STOKER,
O. G. WHITESTINE,
O. L. BOOR,
Committee.



VETERINARY MEDICAL ASSOCIATION OF NEW YORK CITY

(October Meeting)

The regular monthly meeting of this association was called to order by the president Dr. H. D. Gill in the lecture room of Carnegie Laboratory, 338 East 26th Street, New York City, Wednesday evening, Oct. 6th, 1915.

The minutes of the June meeting were read and approved.

Dr. Rogers of Woodbury, N. J., was unable to be present so the next order of business was taken up.

Dr. Ellis gave a very interesting account of the trip to Oakland, California, and also of the annual meeting of the A. V. M. A.

Dr. Ackerman as delegate to the N. Y. State Veterinary Medical Society reported on the annual meeting held at Ithaca, N. Y.

Dr. W. Reid Blair also a delegate to the State convention endorsed Dr. Ackerman's report and also supplemented the same.

Dr. D. W. Cochran, chairman of the committee, appointed to draft resolutions on the death of Dr. John A. McLaughlin, presented the same, and they were unanimously adopted, ordered spread in full upon the minutes and a copy sent to the family of the deceased.

Dr. Goubeaud, chairman of the committee, appointed to draft resolutions on the death of Dr. W. H. Wright, reported that he had drafted the same and would forward them to the Secretary. This report was also adopted and the resolutions ordered spread in full upon the minutes and a copy sent to Dr. Wright's family.

The secretary then read Dr. A. Downing's letter in reference to the case of Dr. Julius Cavazzi in which he stated that before

further action could be taken it would be necessary for this association to prefer formal charges.

Dr. Griessman stated that as a member of the prosecuting committee of the State Society he had instituted proceedings in this case.

After a rather lengthy discussion preceeding which a letter addressed to this association from Dr. Cavazzi was read by the secretary, Dr. Ackerman moved that no further action be taken by this association in the case of Dr. Cavazzi for the reason that the State Society is now prosecuting. This motion was seconded and carried by a large majority.

The bills for floral tributes to Dr. McLaughlin and Dr. Wright were presented and ordered paid.

In the question box the following question was asked: What is meant by Approved Veterinarian in the Dept. of Agriculture?

Dr. Gill answered that the Dept. of Agriculture has an approved list of veterinarians whose tuberculin tests are approved by the same. The tests made by laymen who conform to the rules of the Department of Agriculture are also accepted.

This subject was discussed at some length and Dr. R. W. Ellis moved that "It is the sense of this meeting that the secretary be instructed to write the Commissioner of Agriculture of New York State urging that applicants for approval to their tuberculin tests be referred to this Association for endorsement. This motion was duly seconded and carried.

Dr. Theo. A. Keller asked about the yearly testing in New York City.

Dr. Gill answered that it has been decided that a blood test should be made at least once a year and every horse tagged for identification. It is proposed to test every horse in the city, but the laboratory facilities of the Department of Health at the present time are inadequate to handle this volume of work. It is suggested that the State Department of Agriculture equip a laboratory to carry on this work.

A discussion of quarantine regulations then followed.

It was unanimously resolved that an expression of thanks be tendered Acting Dean, S. M. Brown, for the use of the lecture room in Carnegie Laboratory, as a meeting place.

No further business appearing the meeting adjourned.

ROBERT S. MACKELLAR, Sec'y.

(November Meeting)

The regular monthly meeting of this association was called to order by the president Dr. H. D. Gill in the lecture room of Carnegie Laboratory, November 3, 1915, at 8:45 P. M.

The minutes of the October meeting were read and approved.

Dr. T. B. Rogers who was scheduled to read an interesting paper on Anthrax was unable to be present.

A discussion of the Veterinary Law of New York State relating to the new provision requiring practitioners to register annually during the month of January with the State Board of Regents, then took place.

The secretary read the law as amended and a general discussion of the changes followed.

On motion, the secretary was instructed to notify the members of this association calling attention to the new registration provision of the law.

A communication from the Commissioner of Health, Dr. S. S. Goldwater, calling the attention of this association to the sale of a colic remedy by one P. Harvey Flynn of 145 Duane Street, New York City, said to contain opium and alcohol was presented to the association for consideration.

Dr. H. Stark stated that he had called the attention of the Department of Health to this case and had also notified the U. S. Attorney General and the U. S. District Attorney.

After some discussion the secretary was directed to refer this case to the U. S. Internal Revenue Department, stating the facts and asking for a ruling regarding the same.

The question was asked "Does the law require a veterinarian to report lesions of glanders found on post mortem examination in an animal that has died of colic.

Dr. Gill answered this by stating that the public health law requires any and all lesions of glanders no matter how they may be found, to be reported to the proper authorities inside of twenty-four hours.

Another question asked was "How long is it necessary to expose a dog suffering from a fractured pelvis to the X-ray, to obtain a good negative?"

Dr. Louis Griessman who has been quite successful in X-ray

work stated that five seconds or less exposure would give a good negative.

After a short general discussion the meeting adjourned.

ROBERT S. MACKELLAR, Sec'y.

—o—

Resolutions Adopted at the Meeting of the United States Live Stock Sanitary Association, Chicago, Ill., December 1 and 2, 1915.

WHEREAS, the live stock interests of this country have recently been menaced by that serious animal plague, foot-and-mouth disease, which many foreign countries have been unable to successfully control; and

WHEREAS, the methods employed by the Bureau of Animal Industry of the United States Department of Agriculture have successfully eradicated previous outbreaks in this country and by so applying the same methods have succeeded in practically eradicating the recent and most extensive outbreak, therefore be it

RESOLVED, that this association unequivocally endorses and sustains the methods employed by the Bureau in the stupendous task of eradication.

WHEREAS, the many owners of live stock have recently suffered tremendous losses from foot-and-mouth disease by the destruction of stock for the public good, be it

RESOLVED, that this association recommends that the Federal and State Governments be liberal in their appraises and recompense the owners for losses to the extent of the full commercial value of the animals destroyed.

WHEREAS, there has been some criticism of the officials of the Bureau and the methods employed by them with the resulting agitation to replace the Chief of the Bureau of Animal Industry by a man who is not a scientist especially trained in animal sanitation; and

WHEREAS, the gratifying results obtained by the present personnel have demonstrated beyond doubt their executive ability, be it

RESOLVED, that this association hereby announces that it would unqualifiedly disapprove of the appointment as Chief of the Bureau of a man lacking scientific training and experience in dealing with animal diseases.

WHEREAS, the Secretary of Agriculture has called a conference on foot-and-mouth disease to enable his department to give a hearing to all persons desirous of expressing their views regarding the disease and the methods of its control;

WHEREAS, the Honorable Carl Vrooman, Assistant Secretary of Agriculture, has very efficiently and acceptably conducted such a conference with fairness to all, be it

RESOLVED, that this association commends the action of the Secretary of Agriculture and expresses its sincere appreciation of the work of the Honorable Carl Vrooman.

WHEREAS, It is necessary to encourage the maintenance of pure-bred herds free from tuberculosis and from which healthy animals may be purchased with some dependable assurance that such stock is free from tuberculosis, therefore be it

RESOLVED, that this association urgently request the United States Department of Agriculture to take some steps whereby all herds free from tuberculosis may be given publicity to the end that the maintenance of free herds may be encouraged.

WHEREAS, it has been reported to this association that the Manager of a creamery in Steuben County, New York, on learning of an outbreak of foot-and-mouth disease had been reported in his vicinity, immediately applied careful and intelligent methods of sterilization as advised by Sanitary Veterinary experts, and

WHEREAS, this association is on record as advocating the sterilization of creamery by-products that are returned to farms, be it

RESOLVED, that the United States Livestock Sanitary Association at its Nineteenth Annual Meeting held in Chicago, 1915, hereby formally commends the aforesaid manager and expresses its appreciation of his diligence and care which have saved the country and the State of New York the expense of suppressing an outbreak of foot-and-mouth disease which, without such precaution, would have probably followed and which doubtless would have meant a large expenditure of public funds. This association further expresses its conviction that such co-operation as is here recognized, on the part of the many people concerned, would greatly reduce the extent and expense of outbreaks of contagious animal diseases throughout the country.

COMMUNICATIONS

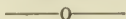
Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

DEAR SIR: In the November number, I saw an article on anthrax in a man at a New York hospital. We had a case of anthrax in a man in Franklin County in the town of Dickinson. Some years ago this last summer an outbreak of anthrax occurred on the farm of William Burnett. The loss was nine cows and three horses.

I was ordered by the Commissioner of Agriculture at Albany to investigate and found it to be anthrax. I vaccinated the rest of the herd with No. 1 and No. 2 anthrax vaccine. No more deaths occurred that year. That fall all of the carcasses that had been buried were burnt with crude sulphuric acid. The following year, in the month of July, another death occurred. The owner skinned the animal and buried the carcass without notifying me. That was six years ago. This year one died in October. He skinned the animal and sold the hide to a dealer in the village of Brushton. This man Burnett had a pimple on the back of his hand but paid no attention to it. Eight days from skinning the dead cow his hand and the under portion of his arm were badly swollen. He consulted a physician, who advised him to go to the Ogdensburg hospital. When he got there Dr. Madill tested his blood from the sore hand and found anthrax germs. Blood from other parts of the body also showed anthrax germs. He wired to Washington for some serum. It took two days to get it. By that time Mr. Burnett was in a very bad condition. Being a clean man and of good habits, after treatment with the serum for a few days he recovered sufficiently to return home.

I was sent there to investigate and vaccinate the rest of the herd. There were no more deaths. I burned the carcasses with the above acid. I went there afterward to try to locate the place where the cow was buried six years ago, but could not until after Mr. Burnett came home from the hospital. He showed me the place. I had posts and a wire fence constructed around the place and burned the grass all over for twenty feet square. No doubt the germs had worked out to the surface in due time from the carcass which had not been properly destroyed.

A. W. BAKER, Brasher Falls, N. Y.



ARMY REORGANIZATION

The work of Doctor Hoskins and the A. V. M. A. Legislative Committee of last year shows its effects in the present Congress.

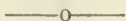
Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

It will be of interest to the veterinarians throughout the country to know that the Chairmen of the Senate and House Military Com-

mittees have the profession in mind in the scheme of army reorganization which is part of President Wilson's preparedness program. In Senator Chamberlain's proposed Army Bill, the Veterinary Service is incorporated as paragraph 17. In Congressman Hay's proposed reorganization plan the Army Veterinary Service is incorporated in paragraph 13. Both measures practically incorporate the ARMY VETERINARY SERVICE bill that was before Congress last year.

Now that we know that the Chairmen of the Military Committees of Congress have our interests in mind, it is of the utmost importance for the profession to see that their respective Congressional representatives do their part in keeping our VETERINARY SERVICE MEASURE incorporated in the final Army Reorganization measure when it is considered.

R. J. F.



REVIEWS

THE PRINCIPLES OF VETERINARY SURGERY

LOUIS A. MERILLAT, V.S.

Including an Authorized Translation, Enlargement, and Rearrangement of General Veterinary Surgical Pathology by Professors C. Cadeac, P. LeBlanc, and C. Carougeau, of the Veterinary High School at Lyons, France. Second Edition revised and enlarged. Alex. Eger, Chicago, Ill.

The revised edition of *The Principles of Veterinary Surgery* by Merillat will be quite a help to the teacher of general surgery, and also to the student who is desirous of having one book that will cover the entire field. The busy practitioner will find in it a vast fund of information especially along the lines of some of the newer phases of veterinary surgery, the development of recent years. Due to its conciseness the information the book contains is made readily available.

The book is divided into two parts. Part I includes: First, Regenerative or Reparative Processes in the animal tissues, giving a clear and thorough description of simple reparative processes, method of healing in wounds and in individual tissues. A short chapter on inflammation follows with a very clear and distinctive classification of the different forms, with a thorough study of the "anatomical processes of inflammation" given in a concise form so that one can readily grasp the subject with the minimum amount of reading. The etiology and treatment of fever or pyrexia are emphasized.

Degenerative processes, which are so important to the veterinarian, have been well outlined, thoroughly discussed, especially in regard to etiology and treatment.

Bacteria and their relation to general surgical conditions have been given a very prominent place, chapter V being devoted to the classification and study of the different forms of organisms commonly met with in surgical conditions. The surgeon realizes the importance of microorganisms in surgical conditions, as he must always battle to prevent wound infection. The author no doubt had this in mind when he says, "nearly all of the pathogenic microorganisms might on some pretext or other, be classified with the so-called 'surgical bacteria'"; and "the surgeon must cope with all bacterial forms that are capable of producing local or systemic derangement by directly invading the trauma and all of those that produce diseases requiring surgical intervention". A short and clear description is given of the most common organisms.

Veterinarians are realizing more every day the importance of considering immunity and the different methods of producing immunity in coping with the various disease processes. From the surgeon's standpoint this is of great importance in protecting the animal against infection following surgical operations. Raising the opsonic index previous to major surgical operations is worthy of trial in cases where the operation can be delayed. In chapter VI there is a very concise discussion of the types and theories of immunity, opsonins, sera, vaccines, which commends itself to the student and practitioner.

Surgical restraint which very properly belongs to general surgery is given sufficient space to familiarize the student with the common methods used in preparing animals for surgical operations.

Progressive veterinarians know the importance of anesthesia for controlling animals in both major and minor surgical operations. The time is coming, and we hope very soon, when veterinarians will resort to anesthesia in practically all major operations, in justice to the patient, the client and themselves. The methods of anesthesia (local and general) are taken up at considerable length in chapter X and all phases fully discussed.

One of the very essential things a surgeon should take into consideration is proper asepsis, antisepsis and the sterilization of the hands, instruments, etc., before attempting any surgical operation. This subject has been given the prominence it deserves in

chapter XI. An excellent outline is given for the procedure in wound treatment which should be read by every student and practitioner. Practical hints are given for the preparation of the material and patient for aseptic operations. If these suggestions were carried out by practitioners success would be assured in most cases.

Part II of the book takes up the general pathological conditions in so far as they relate to surgery. Wounds of various kinds, abscesses, ulcers, etc., are discussed at considerable length and well classified.

Specific infectious diseases are prominently mentioned and their importance considered from the surgeon's viewpoint.

The last chapter gives a thorough description and classification of the various varieties of tumors found in the different animals.

The book as a whole is neat in appearance, well bound, but it is to be regretted that it was thought necessary to use small type in order to reduce its size.

The author is to be congratulated on presenting to the student and practitioner such a commendable treatise on the principles of veterinary surgery.

O. V. B.

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY

W. A. NEWMAN DORLAND, A.M., M.D., F.A.C.S.
Eighth Edition. W. B. Saunders Co., Philadelphia and London.
Plain \$4.50 net. Index \$5.00 net.

An up to date dictionary is as indispensable to a veterinarian as to a physician. New tests and methods of diagnosis are being constantly devised, and to keep abreast with the technique of modern practice, one must familiarize himself with them. The present edition shows that the list of tests has grown from ten pages in the original edition to nineteen. Several hundred new terms have been defined and the text matter has been increased by thirty pages.

To students and practitioners alike a dictionary is a fundamental necessity in order to determine the meaning and pronunciation of more or less uncommon words which they must encounter. A good dictionary is one of the fundamentals of an education.

P. A. F.

NECROLOGY

WILLIAM F. MYERS

Dr. Myers shot himself accidentally while hunting on Thanksgiving day and died the following night.

Doctor Myers was 51 years of age. He graduated from the Chicago Veterinary College in 1889 and located in Fort Wayne where he enjoyed an excellent practice. He was an active member of the A. V. M. A. and all who attended the Indianapolis meeting will recall his indefatigable efforts to make it successful. Doctor Myers was a bachelor and lived with his mother, to whom he was devoted until her death a few years ago.

The writer roomed with "Billy" Myers in college and a more congenial companion could not be found. Free from criticism and hypocrisy he had a laugh and a joke to smooth over every rough place; charitable, generous and genial. Billy was a prince of good fellows. The fact that over thirty veterinarians gathered at his funeral, but feebly expresses the esteem in which he was held by those who knew him best as a clean, lovable fellow with a high sense of honor.

He was a great lover of nature and children. To the hundreds who have enjoyed his whole-souled hospitality at his cottage on the lake, his sad death was a terrible shock, but everyone who knew him acquired a sunnier and more charitable view of life.

I can see him now in our college days as he sat at the piano playing and singing a rollicking song and the chorus comes floating down through the years: "I'm a man you don't meet every day." Surely one did not meet such a good fellow and true friend every day.

N. S. MAYO.

PROFESSOR JAMES McCALL

Professor James McCall, principal and founder of the Glasgow Veterinary College in Scotland, died on November 1 at the age of eighty-one years. Dr. Joseph Hughes of Chicago and Dr. W. H. Dalrymple of Baton Rouge, La., are former students of Professor McCall.

EMMET K. BUTTS

U. S. Veterinary Inspector Emmet K. Butts, formerly of Dryden, N. Y. was killed in an automobile accident at Atlanta, Ga., December 19.

MISCELLANEOUS

A special course for licensed veterinarians will be given in the School of Veterinary Medicine at the University of Pennsylvania during the week beginning January 24th. The course will include lectures and demonstrations in medicine, surgery, pathology, milk hygiene, stock judging, etc.

The semi-annual meeting of the Missouri Valley Veterinary Association will occur in Kansas City, February 1st, 2d and 3d, 1916.

The marriage of Miss Pearl Elvesta Gossett and Dr. M. M. Leonard of Asheville, N. C. occurred November 10th. Dr. Leonard and Dr. S. H. Stephens have recently formed a partnership for the practice of veterinary medicine.

Dr. Alfred Savage of Macdonald College, Quebec, after spending the summer and fall in camp, is expecting to go overseas with the Army Veterinary Corps.

Miss Johnnie Mary Stewart and Dr. William Thomas Hufnall were united in marriage last September. Doctor Hufnall is food inspector at Port Arthur, Tex.

The average American farm family consumes over \$100 worth of meat per year.

It is reported that one new herd of cattle in Illinois came down with foot-and-mouth disease December 14.

A meeting of the Western New York Veterinary Medical Association was held at the Hotel Statler, Buffalo, December 16.

An interesting "Brief History of the Cattle Tick Fight in Louisiana to Date" is given in Circular No. 6 of the Louisiana State Live Stock Sanitary Board. The author is Dr. W. H. Dalrymple of Baton Rouge, La.

According to *The Farmer*, St. Paul, Minn., the health of the live stock of Minnesota shows a high state of efficiency. In the period beginning August 1, 1914 and ending July 31, 1915 there were tested for tuberculosis 51,866 head of cattle with 1,495 reactions or 2.84%. The pure bred herds of the state are practically clean, less than 1% showing reactions during the year. Glanders has almost

disappeared. In 1905, 606 horses were killed on account of glanders. The number of cases has declined steadily year by year to 38 in 1914-15.

It is stated that the most noteworthy achievement of the Minnesota Live Stock Sanitary Board was the effectual stamping out of foot-and-mouth disease, brought into the state by infected serum. This piece of work alone more than repays the state for the entire cost of the Sanitary Board since its inauguration twelve years ago.

DELIVERING WRONG SUBSTANCE TO BUYER. A firm in Utah which delivered boiled linseed oil to a customer on an order for raw linseed oil to be given to horses, is declared by the Supreme Court of that State to be liable for the value of four horses which died as a result of use of the oil delivered, and for injury to a fifth. (Wright vs. Howe, 150 Pacific Reporter, 956). The reason for responsibility is stated by the court as follows:

"The plaintiff requested, and supposed he was buying, one article possessing no harmful properties to animals, while the defendant sold him, not an inferior grade or quality of article called for, but a different article possessing properties deleterious to animal life."

The court holds that the case falls fairly withing the rule of law applied by the Texas Supreme Court in which a seller was held liable for loss of a cotton crop attributed to delivery to the owner of chrome green when he called for Paris green for use in killing cotton worms. The damages recoverable in that case were adjudged to be the value of the crop as it stood just before it was destroyed by worms, plus the cost of the compound delivered and the cost of applying it to the cotton, with interest on the whole expenditure.

—*Druggists Circular.*

The annual conference for veterinarians will be held January 11 and 12, 1916 at the N. Y. State Veterinary College at Ithaca, N.Y.

JOURNAL

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Assn.)

PIERRE A. FISH, Editor

ITHACA, N. Y.

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The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

VOL. XLVIII. N. S. VOL. I. FEBRUARY, 1916.

NO. 5.

OFFICERS AND COMMITTEES OF THE A. V. M. A. 1915-1916

The 1916 Meeting, Detroit, Michigan, August 22, 23, 24 and 25

PRESIDENT: R. A. Archibald, N. E. Corner 24th and Broadway, Oakland, Calif.

FIRST VICE-PRESIDENT: V. A. Moore, Ithaca, New York.

SECOND VICE-PRESIDENT: Robert W. Ellis, 509 W. 152nd Street, New York.

THIRD VICE-PRESIDENT: Adolph Eichhorn, Bureau of Animal Industry, Washington, D. C.

FOURTH VICE-PRESIDENT: C. D. McGilvray, Department of Agriculture, Winnipeg, Manitoba.

FIFTH VICE-PRESIDENT: Geo. H. Hart, Health Dept., Los Angeles, Calif.

SECRETARY: C. M. Haring, Div. of Vet. Science, Univ. of Calif., Berkeley, Calif.

TREASURER: F. H. Schneider, York Road and Erie Avenue, Philadelphia, Pa.

LIBRARIAN: James N. Frost, Ithaca, New York.

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- C. J. Marshall (Chairman)—39th and Woodland Ave., Philadelphia, Pa.
Joseph Hughes, 2537 State Street, Chicago, Illinois.
M. Jacob, State Veterinarian, Nashville, Tenn.
Richard P. Lyman, East Lansing, Mich.
George H. Roberts, 105 N. Division Street, Indianapolis, Ind.
C. H. Stange, Iowa State College, Ames, Iowa.
also: elective officers of the association, with the exception of Librarian.)

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- N. S. Mayo (Chairman), 4753 Ravenswood, Chicago, Ill.
A. S. Cooley, State Veterinarian, Columbus, Ohio.
F. Torrance, Veterinary Director Gen'l, Ottawa, Ontario.
S. H. Ward, State Capitol, St. Paul, Minn.
W. B. Mack, University of Nevada, Reno, Nevada.

COMMITTEE ON DISEASES:

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Ward Giltner, East Lansing, Mich.
Chas. H. Higgins, 196 Cartier St., Ottawa, Ontario.
A. T. Kinsley, 1336 E. 15th St., Kansas City, Mo.
K. F. Meyer, 2nd and Parnassus Aves., San Francisco, Calif.

COMMITTEE ON LEGISLATION:

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F. A. Bolser, 1200 Race St., New Castle, Ind.
W. G. Hollingworth, 54 Lafayette St., Utica, N. Y.
James Robertson, 735 E. 44th St., Chicago, Ill.
Hal Simpson, Denison, Iowa.

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DELEGATES TO THE 2ND PAN-AMERICAN SCIENTIFIC CONGRESS, WASHINGTON, D. C., DECEMBER 27TH TO JANUARY 8TH.

John R. Mohler, Bureau of Animal Industry, Washington, D. C.
 N. S. Mayo, 4753 Ravenswood, Chicago, Ill.
 A. R. Ward, Bureau of Animal Industry, Washington, D. C.

THE SECOND PAN-AMERICAN SCIENTIFIC CONGRESS

More than one thousand delegates from the twenty-one American Republics and a large gathering of diplomats, scientists, and interested spectators witnessed the calling to order of the second Pan-American Scientific Congress in Continental Memorial Hall, Washington, D. C., on December 27, 1915. The background was a beautiful collection of the flags of all the Americas, with guards in the uniforms of the United States Army, Navy and Marine Corps in attendance, giving additional color to the ensemble.

From this opening session to the closing banquet on January 8, 1916, various members of our profession, and particularly the committee appointed by President Archibald as delegates from the A. V. M. A., consisting of Doctors Mayo, A. R. Ward and Mohler, as well as the committee appointed by President Dyson of the U. S. L. S. S. A., consisting of Doctors Eichhorn and Gilliland, took an active part both in the scientific and social proceedings.

The purpose of this Congress was to bring into close and intimate contact the leaders of scientific thought and of public opinion in the American Republics to the end that by an exchange of views, results might be reached which would be of service to the peoples of the American continent in producing permanently a friendly and harmonious coöperation. The Congress specially recommended the establishment of an intellectual Pan-American Union to unite the various associations in the different countries of a technical, legal, medical, veterinary, etc. character, declaring that such an organization would lay broad and deep the true foundations of intellectual Pan-Americanism.

Not only scientists but statesmen of note were present and exchanged opinions on matters of special and of general interest. Larger views of large questions were presented to take the place of opinions that had served their day. If what may be called political and governmental questions somewhat overshadowed strictly scientific questions it was with the consent of the scientists present. They, as others, recognized the fact that the momentous new times had put grave problems of statecraft, such as arbitration and international unity, into the foreground and demanded their consideration. And delegates and onlookers alike showed by their attention and applause warm support of all the sentiments expressed.

It is evident that the Congress, which was noted for its spirit

of fraternity, solidarity and common interest, will go down in history for the part it will play in the development of international Americanism, in addition to its contributions to the world of science.

The Congress was divided into nine sections and these into forty-five sub-sections. Speeches were made in Spanish, Portuguese, French and English.

On account of the keen interest in and the importance of the Pan-American topics under consideration by Section III, in which our profession was most vitally interested, it was found necessary to hold an extra meeting of the section, at which time the following resolutions were passed and subsequently adopted by the Congress, which recognized the need of uniform livestock sanitary regulations and believed that the time was propitious for the promulgation of principles which may be readily applied to all the Americas:

The following general principles are recommended for consideration and adoption by all American countries:

I. Each country should maintain a well-organized and competent live stock sanitary service comprising executive officers, field inspectors and a laboratory force.

II. Each country should enforce live stock sanitary laws and regulations, with the view of preventing the exportation, importation, and spread within the country of any infectious, contagious, or communicable disease, by means of animals, animal products, ships, cars, forage, etc.

III. Each country should maintain a thorough live stock sanitary survey to determine what communicable diseases of animals are present, and the localities where they exist. This information should be furnished regularly to each of the other countries at stated periods as a routine feature.

IV. Each country should refrain from exporting animals, animal products, forage, and similar materials, which are capable of conveying infectious, contagious or communicable animal diseases to the receiving country.

V. Each country should enforce measures to prohibit the importation of animals, animal products, forage, and other materials which may convey disease, from countries where dangerous communicable diseases such as rinderpest, foot and mouth disease, and contagious pleuro-pneumonia exists, and which have no competent live stock sanitary service. Animals, animal products, forage and sim-

ilar materials from countries maintaining a competent live stock sanitary service may be admitted under proper restrictions, regulations, and inspections, imposed by the importing country.

VI. Each country, through its live stock sanitary service, should endeavor to control, and if possible eradicate, the communicable diseases existing there. There should be an exchange of information as to the methods followed which have proved most successful in combating animal diseases.

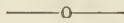
VII. Members of the live stock sanitary service of each of the American countries should meet at regular intervals to consult and inform each other regarding the measures taken for furthering Pan-American coöperation in protecting the live stock industry of the American countries.

Among the papers presented in Section III of especial interest to the veterinary profession were the following:

American International Convention of Sanitary Police by Dr. Jose Leon Suarez, Chief, Bureau of Animal Industry, Argentina; The Pan-American topic, "Is it possible to make uniform regulations among the different American countries for the prevention of the introduction and propagation of diseases of animals?—The prevention and extirpation of animal diseases," which was discussed in separate papers presented by Dr. Julio Besnard, Chief of the National Veterinary Service of Chile; Dr. Rafael Munoz Jimenez of Uruguay; Dr. Francisco Etchegoyen of Cuba, and Dr. A. D. Melvin of Washington, D. C. The effect of parasites on the animal industry, by B. H. Ransom, Washington, D. C.; The prevention and eradication of destructive animal diseases and the effect upon agriculture and the meat supply, by A. R. Ward, Washington, D. C.; The function of live stock in agriculture, by George M. Rommel, Washington, D. C.; The role of the dairy industry in a system of national agricultural development, by B. H. Rawl, Washington, D. C.; The horse in rural industry and recreation by Carl W. Gay, Philadelphia, Pennsylvania; How an animal grows, by H. J. Waters, Manhattan, Kansas; and the swine industry, its importance in agricultural development, by D. C. Wing, Chicago, Illinois.

The program of Section VIII on Public Health and Medical Science, was likewise of interest to our profession, especially the following papers: Problems of insect-borne diseases in Pan-America, by Juan Guiteras of Cuba; Present views in respect to modes

and periods of infection in tuberculosis, by M. P. Ravel, Columbia, Missouri; The etiology and prevention of beri beri, by E. V. Vedder, Washington, D. C.; A safe and sane milk supply, by John Weinzirl, Seattle, Washington; A symposium on cancer research with 15 papers by different authors, attacking the problem from different angles; A symposium on life histories of protozoa with 11 papers covering amoebae, intestinal flagellates, cultivation of the parasite of rabies, trypanosomes of Venezuela, animal parasites of Paraguay, etc.; The relation of modes of infection to the control of bacterial diseases in Pan-America, by M. J. Rosenau, Boston, Massachusetts.



THE BUREAU OF ANIMAL INDUSTRY

The report of the Chief is of more than usual interest because of the abnormal conditions existing in the animal population in various parts of the country relative to the outbreak of foot-and-mouth disease. In spite of losses there seems to have been gains. The meat inspection showed an increase over the two preceding years. More than 58,000,000 animals have been slaughtered and over seven and one-half billion pounds of meat and meat-food products have been prepared under inspection.

The experimental work for the control of hog cholera has shown that eradication in limited areas may be accomplished by inoculation with protective serum and proper quarantine measures. A general effort to eradicate this disease from the whole country would be a tremendous and expensive undertaking and would require more effective state laws and organizations.

The outbreak of foot-and-mouth disease, methods of eradication, losses and recurrence of the outbreak are referred to in detail. The total appraised value of the animals slaughtered in the process of eradication up to June 30, 1915 amounted to \$5,243,138.55. There were additional expenditures for the disposal of the carcasses and property destroyed in disinfection. One-half of the expense has been paid by the department, but additional sums have been paid for salaries of inspectors, traveling and other expenses.

The eradication of the southern cattle ticks has made good progress and a considerable area has been released from quarantine. The work is receiving a more hearty support from the people and as the areas are cleared efforts are made to build up the beef and

dairy industries. The eradication of scabies of cattle and sheep in the West is also progressing favorably.

The dourine investigations by the complement-fixation test in diagnosing 52,896 samples of blood showed only 2.7% positive as against 4.9% the preceding year.

In anthrax vaccination important experiments have been conducted in the preparation of immune serum to be used in connection with the spore vaccine for immunization. Horses were employed for the preparation of the serum. The serum is injected simultaneously with the spore vaccine and renders only one handling of the animal necessary. The method has been tested in outbreaks of anthrax with very favorable results. A still more interesting feature is the apparent curative value of the serum. Animals suffering from anthrax with a temperature of from 105° to 107° recovered after the injection of the serum in doses of from 50 c. c. to 150 c. c.

Forty-five per cent more blackleg vaccine was distributed than during the previous year. It is the opinion of the chief that this does not indicate that the disease is on the increase but that stockmen are coming to recognize the practicability and value of vaccination.

The physiological investigation of immature veal has been brought to a close. The study of the comparative chemical composition of mature beef and immature veal disclosed no differences that were physiologically significant. In a large number of artificial digestion experiments the veal was digested as rapidly as beef. Feeding experiments on cats gave no indication of harmfulness of immature veal.

Another important discovery is that the viability of trichinae may be destroyed by refrigeration. Infected meat kept at 5°F for a period of ten days destroyed its infectiousness, but a period of twenty days is recommended in order that there may be a proper margin of safety. This should result in much economy for the department as it renders unnecessary an expensive microscopic inspection of pork products prepared customarily to be eaten without cooking.

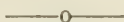
The personnel of the bureau on June 30, 1915 numbered 4,106, an increase of 534 over the previous year. Of these 2,726 were in the meat inspection service.

The accredited list of the bureau now includes 21 American and 8 foreign veterinary colleges. During the session of 1914-15

there were 2,550 students enrolled in the American colleges, an increase of 106 over the preceding session. Of these 698 were graduated, 14 more than the year before.

In the infectious abortion of cattle the most important results of the year's work is the positive demonstration that the placentas of cows which have aborted are sometimes infected with abortion bacilli at subsequent normal parturitions. This indicates that it is relatively easy for abortion disease to be carried into clean herds through the agency of apparently normal cows of which the abortion history is not known.

In addition to meat inspection and the diseases of animals considerable attention has been devoted to investigations promoting the production of all the domesticated animals including poultry, also animal nutrition and dairy products. The work has been extensive and the report is well worthy of perusal, especially by stockmen and others, who during the hurricane of the foot-and-mouth disease charged that the bureau was an agency for the suppression of animal industry.



EUROPEAN CHRONICLES

Bois Jerome.

SLOW RUPTURE OF ARTERIES.—In the conclusion of an interesting article that appeared in the *Presse Medicale*, the question was asked by the author, what were the anatomical troubles that could have given rise in a few weeks to the coats of an artery which had not been injured and cause it to finally give way in some parts of its course and be accompanied by slow rupture and hemorrhage?

To this question, Prof G. Petit of Alfort, has answered in considering the histological mechanism of these slow ruptures, summarizing a report which he had already made to the Societe d'Anatomie, viz: that of a case of fatal secondary hemorrhage of the external pudic artery which had occurred in a horse that had been operated on for a big double chronic inguinal hernia. The sequela of the operation looked normal when suddenly one morning, twenty days after the operation, blood escaped freely from the scrotal incision and after a few minutes the exhausted animal dropped and, notwithstanding packing of the parts, died in a few minutes.

Postmortem was made immediately and revealed no other lesion explaining death than the hemorrhage by arterial rupture.

The edges of the wound, filled with a big clot were granulating normally, but in separating them, there was found a separation between the abdominal walls and the skin which was filled with a mass formed of pus and pieces of necrosed tissue, having a very offensive odor. Minute examination of the walls showed them covered with soft granulations and at the bottom of a slight depression, concealed by pus, a longitudinal orifice, opening in the lumen of an artery, as big as a lead pencil with edges grayish, almost straight but slightly bent outward.

Sections made at various levels, permitted one to trace the course of the artery and to identify it through the fibro-lardaceous tissue where it ran. It was the external pudic artery, which had ruptured a little below the point of origin of the posterior abdominal.



After thus briefly recalling this case, Prof. Petit goes on with the histological and pathogenic study of the arterial fragments collected and saved.

A cut made on a level with the arterial rupture showed the alterations of the walls, which explained why it could suddenly give away under the pressure of the blood.

The edges of the solution of continuity were irregularly arranged and bent outwards by the elasticity of what remained of the middle coat.

In about one-half of the circumference, the walls of the artery were normal. It was in continuity with the surrounding connective tissue which by inflammation had become lardaceous.

On the contrary the other half projecting in the wound was in close contact with pus. Its structure was much altered. The periartery had completely disappeared, the mesartery was thin and torn in some points: only the internal elastic coat had remained intact, also the deeper fibres of the elastic structure. The smooth muscular cells were in a necrosis of coagulation and even in the most extreme curves were replaced by infiltrated leucocytes.

The endartery, much thickened and already fibrous, alone formed the entire wall on a level with the weak point of the mesartery and was already invaded by the pus.

Such were the arterial lesions revealed by the microscope.

The pathogeny is easily made out by a close histological study of the blood vessel. It can be summarized as follows: suppuration

invaded the periarterial connective tissue, which promoted the process preceding the denudation of the vessel. The destruction of the external coat, when it took place, is fatally followed by other disorders.

The mesartery, now in contact with the suppuration, directly impregnated by microbial toxins, and besides without the vasa vasorum which fed it, becomes degenerated. Necrosis of the smooth muscular cells follows from the outside inwards and as a consequence the elastic structure loses its resisting force. The endartery is in turn affected, by the toxins which penetrate through the middle coat, reacts and becomes thicker.

The arterial wall at the point where it is in contact with the pus, is then exclusively formed: 1° of a very thick fibrous reacting endartery, 2° by a degenerated necrosed mesartery, infiltrated with pus in its external layers and exposed to a sudden distension and rupture.

Under the pressure of the blood the endartery thick and entirely fibrous may be distended, the mesartery degenerated and at its extreme limit of resistance, breaks here and there in fissures and then in places the endartery is in direct contact with the pus which penetrates through it.

The dilatation progressively is more accentuated and finally, suddenly the endartery gives away, where there is less resistance.



The preceding study brings in evidence the properties of the three arterial coats, so closely separate from each other.

The mesartery, functionally the most important coat, elastic, contractile, highly differentiated, nourished and protected, externally by the periartery, inside by the endartery, unable to react to consolidate itself never undergoes degeneration, except secondarily. To become affected, pus must have first destroyed the periartery or adventitious coat.

The degeneration of the contractile cells, the destruction and progressive separation of the elastic lamellae and net-work is followed by the hypertrophy of the internal coat, threatened by the sudden danger of rupture. But this hasty and imperfect consolidation cannot resist the progressive dilation of the artery under the pressure of the blood, the external coat being entirely destroyed and the middle one degenerated. Then the blood vessel gives way on a level with the weak spot.

JOHNE'S DISEASE.—In my last chronicle, the contents in the September number of the *Journal* of McFadyean, I took up the excellent article by Prof. Merillat on respiratory anesthesia of animals.

But there was another article also of great interest, viz: the records made from the research laboratory of the Royal Veterinary College, of twelve cases of Johne's Disease, which had been submitted to the drug treatment of ferrous sulphate and dilute sulphuric acid for various lengths of time.

Signed by such authorities as Sir John McFadyean, A. L. Sheather and J. T. Edwards, the report is made with minute consideration of the manifestations offered by the animals, with the descriptions of the lesions found at the post mortems of the cows, the microscopic examinations, etc., with the discussions of the results, all handsomely illustrated, and ends with the following conclusions:

“In many cases of Johne's disease, treatment with ferrous sulphate is followed by improvement, the diarrhea being checked and the loss of condition arrested.

“In the majority of such cases, the improvement is not very great, and the disease soon resumes its ordinary course. In some cases the treatment fails to effect even a temporary improvement or check the diarrhea and loss of condition. In a minority of cases, the treatment has surprisingly beneficial results, suggesting even a complete recovery with disappearance of the diarrhea and restoration of the animal from a state of emaciation to excellent condition. Even in the last class of cases, a relapse which does not yield to a repetition of the treatment is likely to occur and it is doubtful whether the treatment ever effects an absolute cure.

“In view of the uncertainty and of the slow recovery of weight in the most favorable cases, treatment cannot be advised except in special circumstances.

“As a rule, the most economical plan is to destroy the subjects of Johne's disease as soon as the disease is manifested by clinical symptoms. This course is indicated not only by the uncertainty and expense of the treatment but also clinically diseased animals, even when under treatment are highly dangerous, unless strictly isolated.

“In the case of specially valuable animals, such as pregnant pedigree cows, treatment may justifiably be tried, in the hope that

it may carry the animal over the period of parturition, even if it does not effect a cure.

"The treatment may also be justified in cases in which the disease has been diagnosed in apparently healthy animals by testing with avian tuberculin or "Johnin" and their slaughter is not considered expedient by the owner."

—O—

DYEING WAR HORSES.—This question is one of great moment and is of importance to reduce as much as possible their visibility. Many experiments have been made and several of the results obtained have been recorded in daily and scientific papers.

Doct. Bouchet, Major Veterinary has presented before the Societe de Pathologie Comparee a method which has given him great satisfaction and which indeed commends itself by its simplicity of application, the excellent dark brown chestnut coloration it gives to the coat of the animal, its lasting hue, its harmless condition to the horse, and its very reduced cost.

The author has made many experiments with permanganate of potash, nitrate of silver, picric acid, sulfuret of copper, methylen blue, tannate of iron, sulfuret of mercury; but finally adopted the method he recommends which consists in fixing on the hairs an insoluble black sulfuret of lead, obtained by the successive application of polysulfuret of potash and one of neutral acetate of lead (Goulard's extract). These salts are used in solution of 5%.

The surface of the body of the horse is first impregnated with one or the other of the solutions, it matters not which it is, but with animals having a very fine delicate skin, it is better to employ the acetate first. No previous soaping or scrubbing is necessary and some times is even injurious.

The solution is poured slowly in small quantity over the body, with a hair brush it is slowly and carefully rubbed in, in the direction of the hairs or against them, so as to make the imbibition as thorough and equal as possible. Hard rubbing is not necessary, especially in the places where the skin is thin such as the face, the points of the ischium and the internal portion of the legs. It generally takes one hour to make the application properly. Three litres of solution are necessary and sufficient.

The chemical reaction of the two salts should take place, not only on the surface of the coat, but even in the structure; it is necessary to wait for the first imbibition to be thoroughly dried.

Exposure of the animal to the sun will secure that condition easily.

After about one hour the surface of the body has become perfectly dry and is ready for the application of the second solution, which is applied in the same manner and care as the first. The same brush can be used after thoroughly soaking and cleansing with pure water.

The horse is then exposed to the sun for a while and afterward taken to his stall.

The next day his coat is of a dark burnt chestnut color. The ordinary grooming can be carried out. Another application of the solutions made the following day or later will darken the coloration.

The coat of the animal remains the same tint until it is shed or when the hairs drop.

No organic trouble has ever been observed by this dyeing method and the skin has kept up its suppleness.

The solution used can have a very beneficial effect upon animals that suffer with mange and pityriasis.

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CARTILAGE GRAFTING.—This has been the subject of a communication before the Société de Chirurgie by Doct. Morestin, a subject which is of importance in its application. Recorded in the *Presse Medicale* I make extracts from it.

First of all the author recalls that the grafting of cartilaginous tissues has already been done in surgery, especially in rhinoplasty. And then putting that question aside, he desires to call attention to the use of such grafting as he has lately had the opportunity to do in the repairing surgery of the facial or cranial skeleton.

Before the exhibition of specimens upon which such grafting had been made he presented some concise general indications demanded for such operations.

Any of the cartilages can be used. Practically the costals and especially, in a limited number, those of the 6th, 7th and 8th ribs are the ones most easily taken.

The resection of the cartilages is never followed by serious sequelæ, provided care is taken and if by the application of the sutures, the musculo-aponeurotic layer is properly preserved and built up again. Even after the removal of the three cartilages, above mentioned, no accidents, no inconvenience, no lasting respiratory difficulty, no tendency to hernia and no pain have been observed by the author.

The first advantage obtained by these collected cartilages cannot be compared with those of any other similar operations, especially in the rebuilding of the cranio-facial skeleton. The costal cartilage can be easily cut with the bistoury into little bands or baguettes or flexible arches which can be twisted in all shapes so as to be adapted to their proper destination. No assistant, no special instruments are necessary to prepare the pieces that are to be used in this kind of operation.

Notwithstanding this facility of being worked, cartilage offers great resistance and every graft soon takes the place of bony tissue.

The transplanted pieces become really grafted, live their normal life, and rapidly become adapted to the new condition of existence.

This grafting always succeeds even when, so to speak, that of bones is so difficult to obtain. Not only is immediate success the rule, but it is lasting. The grafted cartilage lives indefinitely without being resorbed and without appreciable diminution. This is important, because in practice one does not have to count upon the reduction in the size of the grafted fragments, which can be prepared with exact and rigorous proportions.

The grafts can be obtained from any other subject and will succeed as well as if they were taken from the operated subject himself. Although it is less certain that he will not show some dystrophia or some reduction.

In cases where cranioplasty was indicated all the cases where it was performed have been successful. By the use of these cartilaginous grafts Morestin has obtained wonderful results in the surgery of cranial injuries, of crushing of the frontal region, of building up injuries of malar bones, of the orbits or of the maxillary bones in which the bones had been crushed and removed.

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CONTAGIOUS EPITHELIOMA IN CHICKENS.—There are in several states of North America, agricultural stations which are more or less intimately connected with the universities of the states where they belong. Not infrequently there are published by the officers, I mean the veterinarians and their colleagues, bulletins which contain the results of their work and are full of valuable practical information.

Doctor Winfred B. Mack, veterinarian and bacteriologist with Doctor Edward Records have favored me with a copy of Bulle-

tin No. 82 published by the University of Nevada, upon the control of contagious epithelioma in chickens by vaccination. In a few pages the subject is treated by an introduction first, the consideration of the identity of the disease, the treatment by vaccination with records of the results obtained. The little pamphlet is summarized in the following conclusions:

"The etiological identity of roup, avian diphtheria, and contagious epithelioma is a subject of controversy which requires further extended research to settle. For that reason it is uncertain whether the cases dwelt on in the experiments were caused by pure contagious epithelioma virus or were due to mixed infection.

"The use of a virus prepared by triturating the morbid products collected from the skin and mucous surfaces and attenuated at 55°C for an hour, checked the spread of the disease promptly and exercised a favorable influence upon visibly infected birds. Cases thus treated ran a shorter and milder course than those not treated and the mortality was materially reduced.

"Two injections were sufficient in most instances but severe or advanced cases were benefited by a third and larger dose.

"In five flocks containing 3062 birds, 1608 of them thoroughly exposed and 1394 or 45% of them visibly infected the spread of the disease after vaccination was negligible. Of the 1394 visibly infected birds 299 or 24.45% died and 1095 or 78.55% recovered.

"On the whole, the treatment was satisfactory and successful. In five flocks no unfavorable results followed the subcutaneous administration of the vaccine but in two flocks serious toxic and septic processes were apparently caused by it. The crude preparation used is not, therefore without danger and a more refined product must be desired. However, the conclusion that in this method we have a fairly efficient manner for promptly checking outbreaks of contagious epithelioma or the other uncertainly defined diseases, if there be more than one capable of producing a similar morbid condition of fowls and a therapeutic agent of considerable value, appears warranted. Furthermore, that the prevention and control of the disease or group of diseases may eventually be placed on a sound scientific basis seems certain."

BIBLIOGRAPHIC ACKNOWLEDGEMENTS.—(Collected papers from the Research Laboratory of Parke, Davis & Co., Reprints, Vol. 3. A very interesting volume and collection of scientific information of great value published by and under the direction of Dr. E. M. Houghton.

Investigations upon the occurrences of onchocerciasis in cattle and associated animals in countries other than Australia by George Swelt, lecturer on biology and parasitology in the University of Melbourne.

Investigations into the cause of worm nodules (*Onchecerca* Giboni) in cattle by J. F. McEachran, M.R.C.V.S., and Gerald F. Hill, F.E.S., of the northern territory of Australia.

Rapport of the Service Veterinaire Sanitaire by H. Martel. Bulletin 240 from B. A. Industry on pasteurizing milk in bottles and bottling milk pasteurized in bulk by S. Henry Ayers and W. E. Johnson.

Bulletin 259 from the B. A. Industry on studies on changes in the degrees of oxidation of arsenic in arsenical dipping in baths by Robert M. Chapin.

A. L.

RABIES IN THE WESTERN STATES. The rabies situation in Nevada and adjoining states has become very serious. The coyote introduces a very troublesome element in the matter of control. The public health laws of the localities concerned appear to be inadequate for the situation and as the matter is more extensive than the live stock laws contemplated relative to public health, some arrangement by mutual agreement with local officers to overcome the deficiencies in the law is necessary.

Through the efforts of Dr. Mack, the U. S. Biological Survey has fifty men employed in northern Nevada in eradicating coyotes in charge of an inspector and much efficient work has been done. It is planned to have a small army of men in the field to hunt, trap and poison coyotes.

There has been organized a body to be known as the Nevada Rabies Commission to consist of the governor, Dr. Mack and three men to be appointed by the governor. This commission will have charge of the work for the state and as soon as organized will enter into negotiations with the federal government.

It has been decided that the coyote must go between the Rocky mountains and the Sierras. The task is a stupendous one but it is believed the states and the federal government can accomplish it.

FOOT-AND-MOUTH DISEASE WITH SPECIAL REFERENCE TO THE OUTBREAK OF 1914-1915

(Continued from page 419)

FOOT-AND-MOUTH DISEASE IN FOREIGN COUNTRIES

Because of the prevalence of foot-and-mouth disease in Europe and South America, importations of live stock into this country are limited practically to shipments from Great Britain, Ireland, and the Channel Isles. Even with these countries trade has been interrupted several times in recent years, for the government does not permit the importation of animals from countries where the disease exists, and there have been several outbreaks in Great Britain lately.

Up to November, 1906, American ports were open to Belgium and Holland. In that month, however, some sheep were taken into Belgium from France where the disease was quite prevalent and brought the pestilence with them. By the end of the year every province in Belgium was affected, and Holland as well. Since that time both of these countries have been fighting the disease, but have not yet succeeded in eradicating it.

In Italy, France, Switzerland, Germany, and Russia the plague has existed so long and has gained such a foothold that it is economically impossible to fight it with the American methods of slaughter and disinfection, for to do so would be to kill a large percentage of the live stock in these countries. In consequence, the authorities appear to be making little or no progress in their campaign. The outbreak, for example, which appeared in Germany in 1888 increased steadily until 1892 when it diminished gradually for a few years but again reached great proportions in 1899. Thereafter it continued to exist to a greater or less extent until in 1911 it attained a virulence unequalled before. In that year 3,366,369 cattle, 1,602,927 sheep, 2,555,371 hogs, and 53,674 goats were affected. At that time the total number of cattle, sheep, swine, and goats in Germany was only 51,319,000 while there were in the United States 172,572,000, or between three and four times as many. It can readily be imagined, therefore, what it would mean to the United States if the disease were to gain the foothold here that it had in Germany, where, as these figures show, approximately one out of seven of the animals susceptible to the disease was affected.

Since the mortality in the disease is comparatively low, rang-

ing from only 3 per cent in mild forms to 30 or 40 per cent in malignant cases, the havoc caused by the pestilence is sometimes underestimated. From the work of various scientists, however, who have endeavored to ascertain the decrease in value of an animal which recovers from an attack, it may be said that on an average this amounts in Germany to \$7 and in Holland to \$10. In this country, with its higher prices, the loss would be correspondingly greater. If these figures be accepted, it is obvious that the amount of money spent in eradicating the disease becomes insignificant in comparison with the loss it causes when left to itself.

The German government, of course, has not left the disease to itself. The more recent outbreaks it attempted to control by the American method of slaughter, but the pestilence had gained too much headway and was too firmly established in too many portions of the country for this method to succeed, and the slaughter of the infected herds had to be abandoned. It now appears that there is no hope of getting rid of it until the virus has worn itself out. At present it seems that as soon as the animal's period of acquired immunity is over and favorable conditions present themselves, the contagion breaks out with renewed virulence, so that the authorities have practically abandoned all hope of controlling it by means of quarantines. One scientist, indeed, has asserted that unless all the infected farms were absolutely isolated and the movement not only of live stock but of persons absolutely prohibited, the disease could not be stamped out. Such a quarantine is, of course, utterly impossible to enforce. In certain portions of Germany, in fact, the farmers, realizing that the disease is inevitable, make haste to be done with it by exposing their stock deliberately to mild cases in the hope that this will result in an immediate mild attack and immunity for a certain period thereafter.

Great Britain, Ireland, Norway and Sweden, on account of their comparatively isolated positions, have been more successful in keeping out the disease. The outbreaks in these countries have been more sporadic and by resorting to immediate slaughter the authorities have been able to stamp them out. After being free for twenty-nine years an outbreak occurred near Dublin in 1912, and measures were adopted which were more stringent than any used in this country. As soon as the existence of the disease became definitely known, so-called "stand-still" restrictions were imposed on the affected district. Not only was the movement of

live stock into or out of the district absolutely forbidden, but no cattle, sheep, goats, or swine could move along or even across any highway or thoroughfare.

Moreover, within each of the affected districts, known as "scheduled districts" were two smaller areas in which there were even closer restrictions. One of these areas consisted of the premises on which the actual outbreak had taken place. These premises were declared to be an "infected place." From such a place nothing could be taken of any sort without permission, and no permission was granted until the objects in question had been thoroughly disinfected. No one but the person actually attending the stock was allowed to enter any shed or field in which a diseased or suspected animal had been kept, and the one man who could do so was compelled upon leaving to wash his hands thoroughly with soap and water and disinfect his boots and clothes. He was, moreover, prohibited from caring for any animal which was not diseased or suspected. On farms adjacent to the "infected places" the owners of live stock were ordered to stop all movements of their animals, and these orders together with the other regulations, were enforced through the local constabulary who closely guarded all infected places. This patrol was so strict that it was practically impossible for anyone to pass into or out from the forbidden area without instant detection.

Within the "scheduled districts" house-to-house and farm-to-farm inspection was carried on by veterinary inspectors who not only examined live stock but made a record of the number on each farm in order to detect any cases of surreptitious shipments. Exposed stock was slaughtered, as has been done in all sections where satisfactory progress has as yet been made in stamping out the pestilence.

In addition to slaughtering the stock, farmyards and similar places were thoroughly disinfected; the fields in which the animals had grazed were carefully strewn by machines, with newly burned lime; stacks of hay were disinfected by superheated steam, the foxes in the neighborhood were destroyed as far as possible by poison, and all persons in the neighborhood were compelled to tie up their dogs. The wheels of all vehicles and the feet of horses which left the "infected places" were previously washed with disinfectant fluid, and cans of this liquid were placed about in fields so that there would be no excuse for anyone failing to observe the required precautions.

These methods were successful in stamping out the disease, although there have been one or two minor outbreaks in Ireland since that time. In this connection it is interesting to note that the authorities in charge of the campaign were unable to discover any clue to the origin of the pest. "Foot-and-mouth disease," they reported, "is of such an infectious character and may apparently be carried through so many diverse and elusive ways that in this, as in other cases, it is most difficult to fix on any specific medium of diffusing the infection. The disease was probably carried, for the most part, by persons who had been in contact with infected animals, but the connection between the various cases could not be definitely traced except in one or two instances."

The disease is also more or less prevalent in Denmark, Austro-Hungary, Spain, and in the Balkan countries.

Australia and New Zealand have remained free from it.

We have less accurate information regarding Asia and Africa, but the disease is known to prevail in Japan and China and in the Philippine Islands, and it is doubtful if any considerable part of the Orient is free from it.

Foot-and-mouth disease seems to have become established in the South American republics. It is common in Argentina, Brazil, and Uruguay.

In Brazil it is reported to have caused great losses among the wild deer; some parts of Brazil being almost undiscovered country, it would appear that the disease has passed beyond all official control.

In Uruguay, where Dr. Salmon spent six years as head of the veterinary department of the university of that country, it is stated that cases of foot-and-mouth disease could be seen every week at the abattoirs, although the existence of the disease is not officially reported, but is acknowledged.

According to Professor Lignieres of the Argentina Veterinary Department, all idea of the renewal of exports of live stock from his country to Great Britain may be dismissed for an indefinite period, for he declares that foot-and-mouth disease is permanently established in Argentina. It is stated that not only has the disease spread over the country but it has also assumed a virulent form, causing deaths up to 18 per cent. in herds and flocks attacked. The stock owners have opposed the adoption of rigorous measures for repression of the disease under the hope that it would die out

naturally, and now it threatens to invade the whole of the territory propitious for its development.

SYNOPSIS OF FOOT-AND MOUTH DISEASE IN EUROPE
DURING THE PAST FIVE YEARS

Reports are received from some of the European countries at very irregular intervals, in which cases statements are given below from such reports as have been received.

ENGLAND

Month	1911		1912		1913		1914	
	Out-breaks	Cases	Out-breaks	Cases	Out-breaks	Cases	Out-breaks	Cases
January	0	0	0	0	0	0	0	0
February	0	0	0	0	0	0	0	0
March	1	18	0	0	0	0	11	74
April	0	0	0	0	0	0	0	0
May	0	0	0	0	0	0	0	0
June	0	0	4	38	0	0	0	0
July	6	402	51	246	0	0	0	0
August	1	5	15	128	0	0	3	14
September	1	16	11	187	0	0	8	20
October	9	26	1	37	0	0	2	17
November	0	0	0	0	1	23	0	00
December	1	20	1	9	1	50	3	18
TOTALS	19	487	83	645	2	73	27	143

BELGIUM

Month	1911	1912	1913	1914
	Cases	Cases	Cases	Cases
January	0	2,683	394	660
February	209	1,196	855	742
March	336	702	586	131
April	1,639	822	194	17
May	11,377	333	601	121
June	68,763	206	674	0
July	153,608	94	934	* 17
August	105,532	116	3,166	—
September	62,824	108	5,408	—
October	32,890	16	6,670	—
November	22,215	0	5,173	—
December	7,598	76	3,267	—
TOTALS	466,991	6,352	27,942	1,688

* Last report received from Belgium.

THE NETHERLANDS

Month	1911	1912	1913	1914	1915
	Outbreaks	Outbreaks	Outbreaks	Outbreaks	Outbreaks
January	0	75	16	1	110
February	44	90	13	5	* 88
March	138	62	11	2	...
April	330	31	6	1	...
May	4602	18	3	0	...
June	18214	12	1	0	...
July	12358	2	0	0	...
August	155503	3	0	0	...
September	13477	1	1	0	...
October	4491	0	1	5	...
November	1089	5	2	60	...
December	302	6	3	131	...
TOTALS	70548	305	57	205	198

* Last report received from the Netherlands.

DENMARK

Month	1911	1912	1913	1914	1915
	Outbreaks	Outbreaks	Outbreaks	Outbreaks	Outbreaks
January	0	251	0	0	114
February	0	243	0	0	* 181
March	4	132	0	0	...
April	1	67	1	0	...
May	1	50	1	0	...
June	0	34	0	00	...
July	1	8	0	0	...
August	0	0	0	0	...
September	4	0	0	1	...
October	45	0	2	0	...
November	154	0	1	2	...
December	278	1	1	43	...
TOTALS	488	786	6	46	295

* Last report received from Denmark.

NORWAY

No cases of foot-and mouth disease have been reported from Norway in the last five years.

SWEDEN

Month	1911 Premises	1912 Premises	1913 Premises	1914 Premises	1915 Premises
January	0	0	0	0	9
February	0	2	0	0	* 0
March	0	7	0	0	0
April	0	2	0	0	..
May	0	1	0	0	..
June	0	0	0	0	..
July	0	0	0	0	..
August	0	0	0	0	..
September	0	0	0	0	..
October	3	0	0	0	..
November	2	0	0	0	..
December	0	0	0	6	..
TOTALS	5	12	0	6	9

* Last report received from Sweden.

GERMANY

Month	1911 Premises	1912 Premises	1913 Premises	1914 Premises
January	10199	13210	121	367
February	14507	9460	181	386
March	19586	6469	115	302
April	24422	1917	32	308
May	12394	4007	22	1028
June	37297	3138	42	2224
July	57332	1743	68	3731
August	75987	724	30	869
September	72477	223	63	8175
October	68170	198	186	13599
November	53120	172	629	12559
December	26242	226	778	* 5616
TOTALS	471733	41487	2287	49164

* Last report received from Germany.

FRANCE

Month	1911 Premises	1912 Premises	1913 Premises	1914 Premises	1915 Premises
January	0	2959	*	*	*
February	145	1251	*	*	**1733
March	222	687	*	*	*
April	216	463	*	*	*
May	462	684	*	*	*
June	958	1347	*	*	*
July	16027	*	*	*	*
August	33966	1947	*	*	*
September	20729	2747	***22091	*	*
October	14115	3459	*	*	*
November	8527	*	*	*	*
December	5594	*	*	*	*
TOTALS	100961	15544	22091	0	1733

* No reports received to cover such months.

** Report covers from February 21 to March 6, 1915.

*** Report covers from September 28 to October 4, 1913.

SWITZERLAND

Month	1911 Cases	1912 Cases	1913 Cases	1914 Cases	1915 Cases
January	759	1301	1036	2685	1229
February	1013	586	703	1220	904
March	603	620	672	1469	* 559
April	348	256	577	757	....
May	393	428	1226	673	....
June	4796	4267	2505	384	....
July	59805	5903	5588	3119	....
August	109347	3608	10273	3607	....
September	5373	2021	21292	4309	....
October	1515	2096	9906	3326	....
November	1566	1943	9650	777	....
December	1432	1740	5822	1825	....
TOTALS	186950	24769	69250	24151	2692

* Last report received from Switzerland.

ITALY

Month	1911 Localities	1912 Localities	1913 Localities	1914 Localities	1915 Localities
January	57210	14870	15722	3707	1233
February	49091	9053	7291	2337	1123
March	100491	3580	8570	2107	* 838
April	68671	9435	5777	1815	....
May	95625	12831	7302	1217	....
June	406343	3661	11506	439	....
July	112902	3369	16957	1300	....
August	39082	2658	9284	1758	....
September	28373	1880	14046	851	....
October	18232	30905	14238	2146	....
November	29136	81392	8240	1361	....
December	19452	53045	4371	1661	....
TOTALS	1024609	226679	123304	20699	3194

* Last report received from Italy.

AUSTRIA

The status of foot-and-mouth disease in Austria May 31, 1911; 787 districts, 11,013 farms

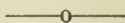
HUNGARY

The status of foot-and-mouth disease in Hungary May 31, 1911; 1,609 districts, 19,045 farms.

RUSSIA

	Outbreaks	Cases
August, 1910.....	7,215	590,349
September, 1910.....	6,225	545,671
October, 1910.....	4,467	314,759
Totals	17,907	1,450,799
March, 1914.....	374	26,017

(No report from Russia between October, 1910 and March, 1914, and none since March, 1914 to date).



ABSTRACT OF DISCUSSION.

DR. HUGHES: I do not wish to discuss this paper from the standpoint of the practitioner and ordinary observer of the disease because that has been exploited to such an extent that it would be time wasted, it would be useless for me to endeavor to bring to your attention the salient features of this disease. But I want to endorse everything Dr. Mohler has said. There are a few little things that probably I might take issue with him upon, but they are so inconsequential that they are better left unmentioned.

This disease, foot-and-mouth disease, I have been observing since I was seven or eight years old. Prior to my taking up the study of veterinary medicine, I had cases to observe—at least three outbreaks on our establishment and in the country surrounding it. I had a chance, in consequence, to become conversant with it early in life. I remember driving a wagon regularly to the fields where the cattle were,—the wagon containing cabbages, that the cattle might be sustained throughout the outbreak. These animals were quarantined under very strict and rigid regulations, and the disease was allowed to run its course, which it did and disappeared, leaving the animals without any mortality, further than the trouble and commercial obstruction incident to the presence of the disease, in the way of quarantines, etc., removal or barter or selling of cattle, shutting down of fairs and markets, the disease at that time was not looked upon as a serious one. Where the disease came from was a problem that was confronting the people. It came ordinarily heralded by newspaper reports intimating that it was at some distant point, say, 100 miles away, and that it might be expected to visit our territory. Ordinarily it came with the regularity of clock work, so that, granting that we had an outbreak, we will say in this year, and that outbreak ran its course, the disease disappeared leaving our cattle in the condition which had previously existed, and did not return until a certain irregular period afterwards—maybe two years—maybe five years. So that it is not to be supposed for a moment that that disease or that outbreak had clung around the establishment or around the locality or neighborhood, but rather that it was brought in. When one comes to ask himself how it is possible that this disease could originate in a state like Michigan where it has originated, he is only asking the question that I have heard asked many times, thirty, thirty-five and forty years ago. So it seems in that respect we are not making any progress in the matter of being able to definitely determine how this peculiar disease appears in a locality, and when probably the next outbreak comes, it will descend upon a community thousands of miles distant.

I have no knowledge, of course, of serum therapy in this disease. Consequently I don't feel that I am in any way competent to discuss it. I am a close reader. There is not anything that has been published on this subject that I have not endeavored to lay my hands upon, and when I could not get it through English channels, I had the matter translated, so that with regard to those dairy show cattle, in the course of time, there will appear a very complete and a very exhaustive report of the handling of those animals. I don't believe that any form of quarantine that could be imposed would control this disease, and as a consequence, I highly endorse the methods adopted by the Bureau of Animal Industry. There is no compromise to be made with me on this subject. But I have been criticised. It has been stated that I have been an obstruction-

ist by associating myself with those dairy herd people to the detriment of the field veterinarian. I want definitely and positively to go on record. I have gone on record before, at the last meeting of the United States Livestock Sanitary Association on this matter, and answered any question put with the regularity of clock work. You have been the obstructionist. I have not been. I want to reiterate here that I associated myself with these dairy people when they were in desperate straits. There was a feeling in Chicago at the time when the disease was discovered at the stock yards and a valuable herd of this kind was on exhibition, that something must be done to save them. The expression was heard abroad: "What of this valuable dairy herd? Why should they be slaughtered as others have been?" Now in the placing of a quarantine, naturally the owners were excluded. Their men to a great extent were excluded. The attendants of these animals were only allowed to converse with outsiders from a second story window. Finally the notion got abroad that these cattle had to go underground, and that got these dairy show people by the ears. As a consequence they sent their manager to me to know whether I would represent them. I want to say again at this meeting that before I concluded to do so, before I would give them an answer in any way, I said: "It has got to be satisfactory to the State of Illinois that I shall associate myself with you" and also to the Washington authorities. I saw the state veterinarian of Illinois. He said: "It will please me immensely if you will act as a go-between". Then I called up Washington by long distance, and I got Dr. Mohler on the telephone. I told him what the existing conditions were in regard to this herd. That there were probably thirty cattle at that time of the dairy show stock which had been removed from the infected quarters to the hospital where they were segregated. Dr. Mohler stated that in his opinion it might be well for me to ally myself with those people, and he gave me some directions as to how, in his opinion, I should endeavor to counteract the disease. So that, you should not accuse me of playing false to the profession, and of being an obstructionist. I am not in any sense. I merely allied myself with those people with the object of endeavoring to determine as to whether or not these cattle could be saved. You understand that if they were slaughtered, the dairy industry of this country would be set back probably fifty or a hundred years, because there are cattle in that herd of inestimable value.

And while I am speaking on that subject, although it is digressing a bit, I might state that the owners of these cattle to-day consider that they have been ill-treated on every side. They were held up at the Union Stock Yards at Chicago, and the most extortionate and extraordinary bills rendered,—\$40 a day for hay, so much apiece for each stall occupied, and at the end of about two months the bill presented by the Union Stock Yards & Transit Company was \$40,000.

and they were asked to promptly settle. They did settle. They settled under protest. Now, the question arises why didn't the state or federal government start in after these cattle and slaughter them? If they had considered the conditions existing,—the feeling existing—they certainly would have to pay well for those animals. And now what is the state of things? Why, these dairy people aren't recompensed,—haven't been recompensed. Should they not, in fairness, I ask, be recompensed for what they have lost? What have they done? Merely carried the cattle through quarantine—not a self-imposed quarantine probably but a compulsory one. But they have paid their bills, and their bills amount to about \$200,000. Is it fair, I ask, for the federal government to send men to value these cattle to find out whether they are worth that amount, and then these men value those cattle at meat value? A number of the calves sold for \$2000 or \$3000 and awaiting delivery, and still they are only worth, in the opinion of these men sent by the government, what ordinary veal is worth. Just imagine that! Jersey cattle, four weeks old, worth say \$10 and \$15 a head, when the owner can, or could, dispose of one of those animals for \$1000. Numbers and numbers of such instances are on record, but I have digressed. I wanted only to throw a little side light on the existing conditions for the information of you veterinarians. These people should not be exasperated. They should not be irritated because they represent a great combination of interest, the great dairy interest, and they are of extraordinary power in this country, and if something is not done—and there is no secret about this—I pity the organization known as the Bureau of Animal Industry. That is exactly the sentiment that prevails and exists to-day as I know it. So that we veterinarians who have or can in some way modify and make light the burden of these people, ought to do it, because numbers of them are almost financially ruined. Some of them have gone broke and have sold the cattle, or allowed them to go for bills which piled up against them. If something is not done—well, I would hate to think of the consequences because I know a thing or two.

Now in regard to slaughter: I will say again, I strongly endorse the position taken by the Bureau of Animal Industry in the matter of slaughter. It is the only way to control this disease. In Illinois to-day we have or are having fresh outbreaks—numbers of them. Dr. Mohler is, of course, conversant with the progress of the disease. I merely have my knowledge from the Chicago papers as they arrive, but they are not by any means getting this under control, and I would have liked to have heard Dr. Mohler deal a little more especially with the subject of the distribution of cholera serum, because we know that here has been the most glaringly bungling affair. This last outbreak in Illinois was caused by the distribution of serum that never should have gotten out. I know something about this too. I know the true history of the entire

matter most thoroughly. I venture to say there is not half a dozen men who probably know as much about this latter outbreak, but we will pass that over.

A number of interesting features developed in connection with my relationship with this dairy herd.

One thing I might state is that when I commenced to study this disease I saw a disease that was of a mixed character; a disease probably closely simulating measles, simulating small pox, simulating typhus. I don't know that the symptoms of the latter were just as marked, but it occurred to me steadily: am I attempting to carry through a bunch of cattle which, when they have run through the course of this disease, will disseminate it? That was incessantly dinned into my ears from all sources. Will the cattle on recovery still be carriers? So that I made a very exhaustive study of this question, from a comparative standpoint. I am not enough of a scientist—even though I were I might not make any progress—but as a man of common sense, one who probably can take a view as intelligent as the average—I could not see how I would have cattle that would be dangerous. Besides I commenced to check over in my mind the history of the outbreak that I had seen in my early life, and I reached the conclusion that no subsequent outbreak that had occurred to my knowledge was due to the cattle that had recovered. So I eliminated from my mind that question. At the same time it was dinned so steadily and constantly into my ears and into my mind that cattle which have this disease are liable to be carriers, and not only that but they are liable to contract the disease again, that it kept me in a constant state of hot water. What is my belief to-day? That cattle which get this disease and recover are immune. I don't believe that any man in this room could infect these dairy show cattle with the virus of foot-and-mouth disease. I don't believe that on the date we left the quarantine at the Union Stock Yards in Chicago—we were quarantined on the first of November and we left the Union Stock Yards on the 12th of December after quarantine—that we carried any disease with us. I expressed that belief at the time. I have expressed it many times since. I am expressing it to-day. I still firmly believe it. That such is the case was proven at the outset by the test that was conducted, and there never was a more gruelling test. I don't believe any animal was ever subjected to such a gruelling test as these animals were before they were released by the Bureau of Animal Industry. Now, gentlemen, these cattle have gone to their respective homes, with one exception and these cattle are commingling and have for months commingled with the cattle that remained on the farms and with the hogs that remained on the farms, and there is no outbreak of the foot-and-mouth disease on these farms. Of course, that is a kind of satisfaction to me. I realize that my association with this bunch of cattle would either

frightfully discredit me, or at least, not allow me to escape criticism. Well, the criticism, I am thankful to say, has been mild. It has not brought me any particular credit, however. I set out to allow these cattle to get well. I maintained a strict quarantine. Did I treat them with any medicine of any kind? No, I did not. They did not need it. I might say, though, I did in some instances treat a few, in this way: The bulls weighing 2500, 2600 and 2800 lbs. were so lame they could not stand up or walk. Why? Their feet were swollen. There was not merely the little vesicle we see between the digits that is indicative of the foot-and-mouth disease, but there was a general swelling and when the swelling receded the flesh receded, especially at the soles, the consequence was that the dry horn had to be removed, but this is inconsequential. In the cases of many of these animals, probably thirty bulls, I had to go down several times and treat their feet, but these thirty bulls are just as sound as ever. There is not a single instance where anything went wrong except one, and that was the animal that got the necrotic infection between the digits. To-day that bull is in good condition, and his foot is not in any way destroyed although we expected to lose him.

I hold that the virus of foot-and-mouth disease is a very benign one, notwithstanding we hear stories of the frightful malignancy of the disease. It is malignant probably if it is treated. You gentlemen, many of you are practitioners, and probably you can take a different view of the handling of infectious diseases from that taken by the strict scientists here in this body. You know as well as I do that we have numbers of infectious diseases, which, if you attempt to treat them, will prove very difficult, but if you cause them to run the regular course will do very well, and if your treatment is anything, it should be of the most simple character conceivable. Take a common case of strangles, for instance. I can take a case of strangles and I can cause it to develop and take such an irregular course just through using certain medicinal agents, that I lose the case. But if I let it alone, it will get along very nicely.

DR. KNOWLES: I might say in reference to the foot-and-mouth disease outbreak in Montana, that as Dr. Mohler has stated, it was introduced by a trainload of cattle taken in there, and that is a very good illustration of how foot-and-mouth disease can be handled by the observation of thorough sanitary and quarantine regulations, and full co-operation of owners and veterinarians with the sanitary officials. In the Montana outbreak there were some 1200 head of cattle, horses and mules, and some hogs; also some sheep. The exact number I do not remember, but there were no new infections except the few cattle on the range that Dr. Mohler speaks of, and the stock-men were as one in co-operating with the state and government officials in stamping out the disease, realizing, owing to

the magnitude of the range country and the enormous value of live-stock in Montana, that the loss would be inestimable if the disease once got a hold. But by strict observance of the sanitary and police laws, the disease was eradicated within a very short time, and Montana has been a free state and is to-day.

DR. EICHHORN: I just want to make a few remarks in reply to Dr. Hughes, as far as carriers and immunity is concerned relative to the disease. According to Dr. Hughes's observation in one single case, he claims that carriers do not exist in that disease, and also that the immunity is an established fact. Now I don't know how far Dr. Hughes's experience goes in foot-and-mouth disease, but he stated that his experience is chiefly based on the observations of the dairy show cattle. From the literature which I followed very carefully, there is no doubt that we have to contend with carriers in this disease. This is an acknowledged fact by the greater scientists all over the country where the disease is prevalent. This has been proven by such men as Loeffler, Zschokke of Switzerland and Neverman of Germany. A great many others also have stated that. They have gone further and established how the virus is carried by some of the animals. That vesicles may many times appear in the horn or the foot or inside of the horny capsule, and unless the virus is eliminated from these vesicles, it may remain in fissures and come to the surface by the natural growth of the horn. When the virus comes to the surface it starts the disease again.

Now as to immunity from the disease: of course, everybody who has ever had anything to do with this disease knows it to be an established fact, not by observation but by scientific proof, that immunity exists in these animals, but it is of relatively short duration, and the duration varies considerably in the different cases. Most of the observations have proven that immunity in animals is of a year's duration or even longer, but there are cases on record—authentic cases—where immunity did not last more than a month, and even cases where it did not last longer than two weeks. I think the data collected in the outbreak of 1902 and 1903 proves satisfactorily that re-infections have occurred within a very short time.

I think it is really superfluous to go into a discussion of this because I believe the teachings in regard to foot-and-mouth disease by men who are acquainted with the progress of the work and study of this disease should familiarize the student with the facts as to what extent carriers may become dangerous in the control of the disease, and also what part immunity plays.

DR. HUGHES: I have intimated that there are few of you who have been around the disease more than I have, and few have read upon this subject of foot-and-mouth disease more than I have. Not that I am a linguist, or one who is educated and versed in various languages, but I have gone through considerable straits to have translations made and knowledge furnished me from varied sources.

Among the European observers there is no man, I think, who stands higher than Dr. Bang of Copenhagen. I have a supreme respect for the gentleman. I have the privilege of knowing him. Dr. Bang is a linguist, a scholar, a scientist, a practical man. I venture to say there is not a more practical man in the entire European country than Professor Bang. He is a member of the Veterinary College of Copenhagen, a school that won't take a back seat to any school in Europe. Does Bang know anything about foot-and-mouth disease? He has been in the thick of it. Denmark has been harboring this disease actively since 1869. England has harbored this disease from 1839 to 1887 without having gotten rid of it once. Surely these people must be observers. Will you permit me to read a little extract from a comparatively recent paper of Dr. Bang dealing with that subject, foot-and-mouth disease? "In no instance was it possible to determine in what way the disease was first introduced into the country,—and this was also the case with later epidemics—but there can hardly be any doubt that it came to us from Germany, which was very badly ravaged during that year." (1869). "I am inclined to connect the dying out of the disease with the introduction of a very careful system of disinfection of the railway wagons used for cattle transport, this disinfection having originally been very faulty. Later, during the next few years there occurred a few very remarkable occurrences on estates (four) which the disease had attacked six months to a year previously. At all four places all the cattle which had been born on the estate after the last attack were killed, and also all cattle subsequently added (respectively, twenty-one, four, thirty-five, and, I think, about forty head), whilst I let the greater part of the stock live,—that is to say, all the animals which had been through the disease on the previous occasion, and all these animals showed themselves to be immune." There is one instance where a practical man expresses his belief in the fact of their immunity.

"As during this period there was not a trace of the disease elsewhere in this country, and there could not have been any possibility of infection from abroad in any of the places mentioned (except through fodder, which is imported by all farms here), it must be assumed without a doubt that the infection had remained hidden on the farm from the previous attack." I think that is possible, but the carrier business, I don't take any stock in. Think of a small pox patient being a carrier two or three years later, or a patient being a carrier of the measles a year afterward! That is a surface trouble; that is not a typhoid condition. "All the houses therefore were subjected to a very thorough disinfection, and, especially at Brorupgaard. I remember that some rather expensive improvements were carried out in the woodwork of the buildings. Nevertheless strangely enough, the disease returned a third time on this farm, on March 2, 1895, that is to say, over a year later. On

this occasion all animals introduced to or born on the farm since the previous outbreak were also killed immediately, making seventy-seven head of cattle in all, whilst I allowed all animals which had previously had the disease to live. They all proved to be immune, even those which had had the disease two years previously. The only possible explanation seemed to be, according to the farm people, that shortly before the appearance of the disease, the cattle had been fed on hay which had been lying in the loft over the cow-house since the previous outbreak. This hay was, of course, burnt, together with any other fodder which might possibly be thought to have been infected through the boots or clothes of the cow-man, and a large sum of money was also spent on rebuilding the cow-house, from which all wood-work was removed and replaced by iron, stone and cement. Since then the disease has not re-appeared on this estate."

I don't want to detain you gentlemen, but I could read to you a little further on where Bang comes out in an absolute flat-footed fashion and endeavors to controvert the notion that immunity does not exist for from one to seven years. He says it is rather indefinite, but that it may be permanent. In fact, he says: "I firmly believe that immunity is the rule."

DR. EICHHORN: I believe myself that immunity of a year or longer duration is the rule, but there are exceptions, and there are quite a number of them stated. Now as far as the carrier is concerned, my previous statement was not based on the instance of just one or two cases, but the last official publication of the German, or rather British government, showed that they made the utmost efforts through their official veterinarians to determine to what extent carriers are responsible for foot-and-mouth disease in Germany. They instructed their men to make the most careful observation and follow each individual outbreak from its origin. Not less than about a hundred cases are cited with the location, the number of animals affected, and all the details, in which they could not trace the disease to any other source than to carriers. Now I think such extensive statistics must be given consideration.

DR. HUGHES: I would state, Mr. Chairman and gentlemen, that Bang, having reviewed the literature of the world on this subject, has reached the conclusion that immunity is the rule. There is only one single case that I can find,—one single instance in which this disease was disseminated through a carrier, and that was through a bull that was shipped to Northern Sweden and a crack was discovered in his foot. It was supposed that the virus filtered into the crack and that it remained concealed for a considerable period.

As far as observations of students in Germany go, I don't take any stock in it. In reading the literature I find that the German policy is to put into the field the young men—they won't let

the old practitioners do the work. Why? Because they disseminated heresy, so they send their youngsters down to make observations. Now if there is an irresponsible, it is a recent graduate.

DR. FROTHINGHAM: Mr. President: I would be very much obliged if Dr. Hughes would leave with us this reference of Dr. Bang—where it is published.

DR. HUGHES: The paper I alluded to, is a paper presented by Professor Bang at the Royal Veterinary and Agricultural College of Copenhagen, October 16, 1911, translated from the *Ugeskrift for Landmaend*, Nos. 43 and 44, 1911. To which Dr. Bang has since made several emendations and additions.

DR. MURPHEY: I don't know anything about the immunity of foot-and-mouth disease, but I am thinking about the immunity of public sentiment, and there was considerable of that in Iowa. There was a law passed down there which was vetoed by the governor, limiting the area of quarantine districts, and according to the newspaper accounts the two men who pushed such legislation and who stated that there was no such thing as foot-and-mouth disease were the Messrs. March and French who were exhibitors at the National Dairy Show at Chicago, and it is a matter of interest to the men in Iowa to see the psychology and viewpoint of the gentlemen.

DR. MOHLER: Personally I shall not even attempt to convince Dr. Hughes with reference to the facts all the rest of us know and which are supported by the most noted foot-and-mouth disease authorities in all countries concerning immunity and virus carriers in this disease. However, I am very glad for the sake of accuracy of statement that he somewhat qualified his remarks about Professor Bang. What Professor Bang has written on the subject of foot-and-mouth disease is open to all and no individual has a monopoly of it. I too am familiar with what Professor Bang says along this line and he very clearly states that as a rule the immunity lasts for two years. I think we all concur in that statement, but Professor Bang does not give this as the minimum length of time of the immunity in all cases. In fact, he distinctly states that while immunity is the rule, there are exceptions. In talking on the subject of foot-and-mouth disease with Professor Loeffler not many years ago he told me among many other interesting facts that he had known of cases where reinfection had occurred within the same year. Dr. David S. White, Dean of the Veterinary Department of Ohio University, stated to a committee of the United States Senate that at Vienna, Austria, he had seen one cow that had contracted foot-and-mouth disease five times in one year. Personally, I had an opportunity of witnessing the recurrence of foot-and-mouth disease in one animal that had recovered from the disease four weeks previously. Text books cite a number of similar authentic cases of this same character, showing a short duration of immunity. It is beyond controversy that these are exceptional cases, but, gentlemen,

it is these exceptional cases that the U. S. Bureau of Animal Industry is attempting to locate and eliminate. It has been the exceptional cases which have always caused trouble. They are the cases that caused the infection at Niles, Mich. They are the ones that became infected on August 8 and served to keep the foot-and-mouth disease alive in this country up to the present. Those exceptional cases which act as virus carriers have been held responsible by certain authorities for the recurrence of the disease in portions of Germany. Bang himself cites an instance where a Dutch bull having recovered from foot-and-mouth disease was taken to Sweden with the result that the disease broke out in the latter country, due to virus carried in an old fissure in the foot of the bull. Loeffler likewise gives similar instances of virus carriers, but no one thinks of these otherwise than as exceptional, unless it is Dr. Hughes who states they never occur. I am not attempting to convince Dr. Hughes on these points; I know I cannot if Bang and Loeffler cannot, but I am very glad to have the opportunity of challenging his statements and of asserting that in the eradication of this disease the exceptional cases must not be ignored.

Now, so far as contaminated hog cholera serum starting a new outbreak of foot-and-mouth disease in Illionis is concerned, we do not know enough about the infection of the different herds to draw any definite conclusions at this time. In my paper I went into the details so far as the facts would warrant. On August 8 I was called up at half past one by a telephone call from Chicago and the information came from Dr. Jenison, our inspector in charge at that place, to the effect that hog cholera serum shipped out from a certain establishment in Chicago had apparently caused infection in the large herd of hogs he had visited that afternoon. The facts which came to me over the telephone that night and which have been established beyond a doubt were that nine shipments had been made from this serum company in Chicago to eleven people who are located in six different counties in Illinois, one county in Minnesota, one in Michigan, and another in Indiana. These shipments of suspected serum were immediately traced to the respective farms and the premises quarantined. Several days later infection was found on these farms in four counties in Illinois. The vaccinated hogs in Saginaw County, Michigan, never did contract the disease because of the prompt action of the men on the Live Stock Sanitary Board and Dr. Dunphy. The animals were destroyed and buried four days after they had been vaccinated without having contracted the disease and a similar method of disposing of the animals was followed with the still healthy vaccinated herds in Ford and Henry Counties, Illinois. The Governor of Indiana was asked to take similar action with the vaccinated hogs in Posey County, but he apparently was hopeful that the herd would remain healthy. A few days after taking the matter up with the Governor the animals came

down with foot-and-mouth disease. They were destroyed and the premises disinfected in the usual manner.

You will note that eight out of eleven herds which received this particular serum became infected with foot-and-mouth disease. Strange as it may seem, we have not thus far obtained positive results from laboratory experiments with this serum. If I see the results in the field giving positive evidence of infection, such evidence is more substantial than one thousand negative diagnoses in the laboratory.

The serum which is suspected of having caused the infection was made on October 29 last at a time when there was not the least suspicion that the serum plant in Chicago was infected. The amount of serum in this batch was 41,000 c.c.'s. A test of it for potency and for foot-and-mouth virus was made in the customary manner by the inspector of the Bureau of Animal Industry who has charge of the serum plants in Chicago, and after waiting a certain period of time without anything objectionable developing in the test animals, permission was given to the firm to dispose of this material. The ten hogs which were used in the test, two of which received as much as 40 c.c.'s each, were subsequently taken to a farm four or five miles out of Chicago and to-day are alive and healthy, as are all the other hogs and cattle belonging to the farmer and which have been daily exposed to the original hogs that were used in the test of the Chicago serum. When this new outbreak occurred in these different herds as a result of what we may assume to be the contaminated serum, we collected samples of the left-over serum from the infected farm, had them forwarded under seal to Washington, and Dr. Eichhorn took the material out to the experiment station, inoculating three calves and twelve hogs intravenously and subcutaneously. As a result of these inoculations there have been absolutely no indication that the serum, which was collected in the field by men sent out to investigate the outbreak in these recent cases of suspected hog cholera serum infection, caused the infection. In no case has any of those fifteen animals developed foot-and-mouth disease.

There is only one possible explanation I can make, and that is, that the field vaccinations were made in large herds, consisting of from 34 to over 200 animals, and only one or two animals in these herds at first contracted the disease. These evidently were very susceptible animals and they alone contracted the disease at the beginning. In order for us to reproduce these field conditions it will be necessary to continue the inoculations on a much larger number of animals in order that we may find an animal sufficiently susceptible to come down with the disease if the serum is contaminated, since the virus must evidently be in a weakened condition from contact for nine months with one-half of one per cent carbolic acid with which all serum is preserved.

Dr. Hughes has referred to the appraisement of the dairy show herd. Two of the three men who were selected by the department to appraise these animals were unknown to me before they became appraisers for the government. I knew only one of these gentlemen. That man I have no reason in the world to apologize for. I refer to Dr. Sigler of Indiana, one of the finest men who ever breathed the breath of life. He is a member of this association and I stand sponsor for him, because I have known his worth for a long time before he became an appraiser. One of the other two appraisers has been the official appraiser for the state of Michigan during the outbreak in that state, while Dr. Sigler had held a similar position for Indiana, both having given excellent service and entire satisfaction to all sides before appraising the dairy show cattle. If Dr. Sigler does not know the value of an animal, I am very much surprised. Born and raised on the farm and owning a large farm himself, he knows the values of farm animals. He appraised the show animals according to his interpretation of the law as passed by Congress. He was not affected or influenced, nor were either of the other two, by any official or other person. They merely read the law and placed their honest interpretation on what they considered to be the intent of Congress.



STUDIES TO DIAGNOSE A FATAL DISEASE OF CATTLE IN THE MOUNTAINOUS REGIONS OF CALIFORNIA*

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In 1913, Dr. Charles Keane, the State Veterinarian of California, asked the writer's co-operation in establishing the diagnosis of a fatal disease particularly prevalent in Sierraville, California.

From the description given, the malady corresponded in many respects with bovine hemorrhagic septicemia. No bacteriological evidence had, up to that date, been collected, the diagnosis having been simply anatomical. The experience which the writer had had in Pennsylvania in establishing conclusively the tentative diagnosis of hemorrhagic septicemia, which had been suggested by the late Leonard Pearson, made the problem, so generously offered, a very attractive one.

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In 1913 two specimens from Siskiyou County were received in such a condition that a careful bacteriological examination, which was attempted, failed completely; only contaminating organisms of the cocci and coli groups were isolated.

In 1914 our attempts were more successful, and I was fortunate in autopsying one case of the disease in California and three cases in Nevada where, according to Dr. W. B. Mack, a disorder which is in many cases similar, if not identical, to the one in California, is causing severe losses in Carson and Sierra Valley.

Dr. J. P. Iverson, Deputy State Veterinarian of California, has, in a gratifying and untiring manner, autopsied a large number of animals and forwarded to me a number of specimens and cultures for laboratory study. Thus far, about ten different specimens from California have been examined. The conclusions which can be drawn from this material are instructive in many respects, and I select this opportunity to present the same, not because they are in any way final, but because they will stimulate discussion and will encourage work along the same lines.

1. SYMPTOMATOLOGY OF THE DISEASE: It is difficult to observe diseased animals because the incipient symptoms are not very pronounced and they succumb to the disease in a very short time. In some cases, however, the most prominent symptom observed was the passage of blood-tinged urine which apparently contained even clotted blood. Liquid feces, with marked bile stain or coagulated blood, were passed. In some cases a hemorrhagic diarrhoea was very marked. In some retarded cases the feces were very hard, dark colored, and formed, covered with adherent mucus. The temperature in some of the cases which I observed was above normal, but not above 105 degrees. The respirations were rapid and markedly abdominal; the general behavior, depressed; the skin and hair, rough. In one case a local swelling on the metacarpal joint, with impaired locomotion, was noted.

The cattle are very frequently found dead without having shown any alarming symptoms. According to the stockmen, the animals will die in from three to four hours following the passing of blood-tinged urine.

I have the impression that the clinical diagnosis is impossible and I have, therefore, concentrated my efforts on the post mortem findings which, however, were not conclusive.

2. ANATOMICAL FINDINGS: There was a marked icterus; num-

erous petechiae and hemorrhages were found in the subcutis. In some cases there was pronounced localized hemorrhagic edemas and exudation with enlargement of the subcutaneous lymph nodes.

The abdominal cavity contained either a small amount of yellowish fluid, or a large amount of well clotted blood. The omentum, peritoneal lining and mesentery were well mottled with hemorrhages, and diffused areas of inhibition surrounded the larger blood vessels. The most prominent lesions were either in the duodenal loop and the adjacent portions of the liver, or in the liver alone. The wall of the duodenum was thickened, jelly-like and dark reddish, frequently covered with fresh fibrin meshes and adherent to the liver; the contents were bile stained; the mucous membrane was slightly swollen and showed fine hemorrhages.

In the jejunum and colon there was either liquid, dark blood-like material, or bile stained, slimy chymus, or dry, adherent, sticky contents. The regional lymph nodes were enlarged, soft and in some portions hemorrhagic. The mucous membrane of the abomasum showed occasionally petechiae and a few erosions, or was also involved in the inflammatory reaction of the duodenum.

The liver was always enlarged, of a peculiar light-yellowish color and soft in consistence. In the middle and Spiegel's lobe there was a large, saffron-yellowish, irregularly shaped area, friable and well defined, which on section imposed as a very large hemorrhagic infarct. The anemic necrotic tissue showed very distinctly several thrombosed blood vessels, mostly veins, occasionally arteries. The serous membrane of the gall bladder was also infiltrated and affected by the inflammatory reaction caused by the infarct. The portal lymph nodes were soft, enlarged and imbedded in a gelatinous mass. The presence of these hemorrhagic infarcts was recorded in every case of which I obtained material in 1914. Also, in specimens quite recently collected, in 1915, the infarct was present. The autopsies in Sierra and Siskiyou counties correspond therein, in every respect.

Two cases autopsied by the writer in Nevada had similar lesions in the liver, but the process had, apparently, further advanced. In a two-year-old steer a large abscess was found in the middle of the liver. It would have been explained on the basis of a foreign body perforation, were it not that a second autopsy of a steer, which was killed and autopsied on the same day, offered a better interpretation of the process. In the latter animal a fibrous

inflammation of the diaphragm, which had also incited by continuation a similar inflammation in the right pleural cavity, covered a typical yellowish hemorrhagic infaret. The abscess in the first animal was, therefore, only the result of infarction and a prominent sign of the etiological identity of the processes.

This striking occurrence of the liver infarets in the different localities has, in my judgment, a considerable bearing on the diagnosis.

The spleen was, in most of the cases, small; perhaps in some portions slightly enlarged and soft. On the capsule a few small or large hemorrhages were noted. The kidneys were dark brownish, spotted with punctiform hemorrhages, and in the medullary portion were diffusely reddish and streaked. The urine was always dark brownish and blood-tinged. The degree of hemaglobinuria varied with the different cases.

In the thoracic cavity a small amount of fluid was found in both pleural sacs. The pleura was smooth and stained with hemorrhages of varying sizes. In the lung parenchyma, small infarets or diffuse lobular and lobar hepatization were noted. In a few cases, extensive inflammatory processes along the trachea, larynx and pharynx were recorded. The regional lymph nodes were correspondingly involved and hemorrhagic. The heart contained always well coagulated blood. The epi- and endo-card showed petechiae, suggilations and hemorrhagic extravasations; the myocard was turbid, flabby and soft.

Judging from the constancy of occurrence of the lesions, the etiological factor was predilective for the liver, lung, serous and mucous membranes.

Involuntarily I recalled the postmortem findings of cases of hemorrhagic septicemia autopsied in Pennsylvania, and I expected to be able to prove, bacteriologically, in a very short time, the etiology of the above mentioned lesions. My late assistant, Dr. Crocker, and myself pointed out, in 1912, that the descriptions of the postmortem findings as given in text-books are incomplete; namely: in acute cases an apparent localization and filtration of the *Bacillus borisepicus* takes place through the blood vessel system of the lung and liver. In such cases the bacterium is never found in the blood, but always in the infarets and can from there be easily isolated in pure culture.

The extensive bacteriological examinations which were con-

ducted with the material of about twelve cases (ten California cases) did not reveal such conclusive results and therefore need more detailed discussion.

3. BACTERIOLOGICAL EXAMINATION: The pieces of organs were wrapped in cloth or muslin soaked in a weak bichloride solution, placed in Mason jars and forwarded on ice to the laboratory. In about eight cases, glucose broth was inoculated with blood material from the liver, lung or spleen. In most cases the cultures revealed the same organisms obtained otherwise, or they were found to be sterile (particularly the blood).

The microscopic study of the tissues did not reveal, in any case, bipolar organisms which could be diagnosed as *B. bovissepticus* without further isolation. Leishman or Giemsa stain was uniformly used for the demonstration. In the liver infarcts, spore bearing, Gram positive rods were found in every case, frequently associated with diplococci resembling pneumococci.

The ordinary culture methods gave no satisfactory answer as to the bacterial flora in the liver, lung infarcts and lymph nodes. Pieces of tissue immersed in glucose broth gave rise usually to the growth of anaerobes or intestinal organisms, some of them staining bipolar, as everyone knows. We immediately used, therefore, the primary animal inoculation as a means of isolating the various organisms seen microscopically; experience had also taught us that the presence of the *B. bovissepticus*, when rare, is revealed only by their pathogenicity for rabbits or mice.

Always one or two rabbits, guinea pigs and mice were inoculated with emulsions (1:2) of the liver infarcts, lymph nodes and spleen material. In this manner we obtained, from about twenty-five rabbits inoculated, two animals which had died from a typical bipolar infection. The material used on these animals came from a two-year-old heifer and a seven-month's-old calf. In the first case, an emulsion of the hemorrhagic mesentery and, in the second case, lymph node material had been inoculated subcutaneously. The two rabbits succumbed to the infection in seven and five days, respectively. The bipolar organisms were found in the *purulent fibrous exudate* of the peritoneum and the heartblood. Subsequent identification showed the comparatively low virulence of the isolated organisms for rabbits, which explains the long course of the disease following the inoculation and other points to which I shall refer later. The *B. bipolaris* isolated from these rabbits gives all the

cultural identity reactions recognized as typical for the *B. bovis-septicus*. Also the pathogenicity tests are characteristic, with the exception that, generally, large doses are required to cause a fatal result in laboratory animals. It is also pathogenic for calves by intravenous inoculation. Death resulted in a three-weeks'-old calf following the injection of 3cc. of a 20-hour'-old broth culture of strain 22 (calf strain) in 22 hours. The two strains are identical and serologically protect against each other and also against *B. bipolaris septicus* strains which were obtained from varied sources in the United States.

The animals similarly inoculated with the same material, or with the organs of ten other cases, remained alive, or succumbed to various other infections which are particularly valuable because they weaken the above recorded positive findings of bipolar organisms in various respects.

(1) All the guinea pigs inoculated with the liver infarct material died from infections with anaerobes associated with *B. coli* and diplococci. The anaerobes resemble the *B. chauvci*, microscopically, because on the serous membranes of the infected animals they form only aggregations of pairs. Culturally and serologically they are, however, a type of pseudo malignant edema bacilli, which have not as yet been described and need further extensive study to be classified. These organisms are present in every case and in every infarct and, when the cadaver is not fresh, they are found in every organ. They were isolated from the California and the Nevada cases and they were, before death, in the diseased livers, because material removed immediately after death, in two calves, contained only these anaerobes in the liver infarcts. The organism is *not* pathogenic by subcutaneous application to calves, and is probably a secondary invader from the intestinal tract.

In our experience in Pennsylvania these anaerobes were also present, but less prominently, and in every instance the *B. bovis-septicus* was also isolated without the slightest difficulty. We have thus far failed to repeat the condition in California.

2. Some rabbits succumbed to infections with the *B. necrophorus*, probably due to contamination of the material. I may mention here that the anaerobic bacillus isolated from the infarcts is causing local necrosis and abscess formation, but never septicemia, in rabbits.

3. The guinea pigs which succumbed to the infection with

anaerobes frequently showed, in the blood and exudate, a diplococcus with a marked capsule indistinguishable from pneumococcus. The same organisms were found in some blood and liver cultures sent from three cases of the cattle disease, in the muscle smears of blackleg cases autopsied in the same localities, and in the pus from the two Nevada cases referred to above.

In our experience these organisms are secondary associates with numerous anaerobic organisms. Biologically they are closely related to the pneumococci. With pure cultures one produces on intravenous inoculation in calves a fatal septicemia, in rabbits local necrosis and septicemia, in guinea pigs necrosis and sepsis, and in mice local edema and septicemia. For the first two animals, large doses have to be used to produce septicemia.

These bacteria are doubtless not responsible for the cattle disease, but have some importance as secondary invaders. In some cases of typical blackleg the same organisms have been found and therefore they do not need further consideration.

4. Most of the mice inoculated with lymph node, liver or spleen material, remained alive, or succumbed to the same anaerobic organisms as did the guinea pigs. The mice inoculated with the same material, which caused a *B. bovisepiticus* septicemia, were sick for several days, but recovered; they were not immune to a subsequent injection with bipolar organisms.

As stated in detail, in two out of twelve cases carefully tested, the primary animal inoculation furnished evidence which would support the anatomical diagnosis of hemorrhagic septicemia. The bacteriological study of the two strains (Strains 10 and 22) suggests the view that the organisms were either present in small numbers only, or that they are exceedingly low in virulence for the laboratory animals. Our experience with hemorrhagic septicemia supports both conceptions and again brings forward the fact that the bacteriological diagnosis of hemorrhagic septicemia is not as easy a procedure as is generally considered. We read everywhere, and have doubtless also been taught, that the *B. bovisepiticus* is very pathogenic for rabbits. Numerous investigators have shown that bipolar organisms can also be found in healthy animals, and that they frequently localize themselves in tissues and take part actively in pathological processes originated by quite different groups of organisms. The careful bacteriologist realizes that the diagnostic demonstration of bipolar organisms is considered limited for these

reasons. On the other hand, we know that in advanced pathological lesions caused by bipolar organisms, particularly when necrosis is present, the bacteria are very rare or entirely absent, a condition which is well illustrated by the liver lesions in some of the cases which I have seen. The very small percentage of cases (Cases I and VI) in which bipolar organisms were isolated, is difficult to explain. Low virulence or localization of the organisms in organs which have not been tested, has to be considered; the question can only be settled by further experiments.

I feel that the bacteriological evidence thus far collected is by no means sufficient to make a conclusive diagnosis of hemorrhagic septicemia.

5. EPIDEMIOLOGY OF THE CATTLE DISEASE: The disease makes its appearance usually at the beginning of July. Sporadic cases occur until the beginning of January. Even after the animals have been removed from the pasture, fatal cases are noted in the stable. During some weeks the extent of the disease is enzootic. Two or three dead animals are found on the ranch on the same day. So far, outbreaks on high, swampy mountain pastures only, have attracted our attention. Age and sex apparently have no influence on the epidemiology. In the same localities anthrax and blackleg exist endemically but the entire livestock is prophylactically immunized against these two diseases and there is no doubt in my mind but that the evidence thus far collected eliminates these two diseases.

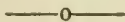
The telluric and climatic conditions in the Sierra Valley are similar to those commonly found in localities where hemorrhagic septicemia is endemic. A careful survey by Dr. Iverson failed to demonstrate any plants which could be responsible for the death of the animals. The question of insects and their seasonal prevalence as having anything to do with the cattle disease, has not as yet been thoroughly investigated but will be undertaken at the first possible opportunity.

EPICRISIS: In the foregoing paragraphs I have attempted to describe the facts which have been personally collected during the study of a destructive cattle disease in California. The experimental records will be published elsewhere, but I feel that an analysis of the inclusive findings is warranted because the animal losses are heavy. Some means should be adopted whereby the stockmen can keep animals on the notoriously dangerous territories, as well as to relieve their already heavy burdens.

Throughout the recital of facts, I have assumed an attitude which will give the reader the impression that I am of the opinion that the disease is an acute form of hemorrhagic septicemia. The anatomical lesions are certainly of such a nature that everyone familiar with the interpretation of lesions would feel that the diagnosis "hemorrhagic septicemia" is logical. Furthermore, the bacteriological results would be confirmatory, in two cases at least, for the unscrupulous laboratory worker. One has to remember, however, that in many different diseases bipolar organisms or *Pasteurella* have been isolated, which in the recent and more critical years of bacteriological knowledge have been recognized as being due to protozoa or filterable viruses. I do not imply herewith that I thing the cattle disease is due to protozoa, because a search along these lines has been made and has been negative. In considering these conditions a certain degree of reserve is doubtless appropriate.

The striking liver lesions are the result of a blood infection; the blood vessel lesions with thrombosis can be followed along the branches of the hepatic arteries, portal and hepatic veins. The lung and kidney lesions have a similar origin; the entire inflammatory reaction on the duodenum follows the primary focus in the liver. The epidemiology and the telluric conditions all strongly point in the direction of hemorrhagic septicemia.

As a working hypothesis, without extending myself further critically, I have assumed that the disease this year is, in all probability, hemorrhagic septicemia. A broad, harmless experiment in immunizing about one-half of the livestock at Sierraville with a special *B. borisepticus* vaccine, using the other half as a control, will perhaps satisfactorily settle the question and establish the long denied diagnosis.



ABSTRACT OF DISCUSSION.

DR. DUNPHY: Mr. Chairman: I have listened with a great deal of interest to Dr. Meyer's paper for the simple reason that we are confronted with a similar condition in my own state. We have a very similar disease among us which has caused considerable mortality, and so far has baffled our efforts to determine what it is. A postmortem revealed a true picture of hemorrhagic septicemia, but our laboratory experiments have not confirmed it. We find on laboratory experiments on guinea pigs we can kill the first pig. The first pig inoculated from the diseased animal will usually die, and

from that on, the material seems to be absolutely non-pathogenic. We have taken the blood of some of those guinea pigs which have died and injected it in calves without any effect whatever. We have done the same thing on other guinea pigs, but in all cases that we have tried, we have found after the first animal infected, that the material becomes non-pathogenic, although the postmortem appearances show almost a true picture of hemorrhagic septicemia and correspond closely with the conditions described by Dr. Meyer. So far we have been unable to establish the fact that it is hemorrhagic septicemia. We have had an unusual season in Michigan this year. It has been very wet. We find the animals affected are on wild pasture, usually low land, and for that reason we have had a botanist examine one of the pastures. He spent a number of days there. He located a few poisonous weeds, such as wild parsley and water hemlock, but I am under the impression that the animals could not have received a sufficient amount of this weed to produce death, or even pathological symptoms. We have gone further: as a number of the parties who had animals die on their premises were under the impression that the disease was contagious or infectious, I took two of these animals—the only two I found before they were dead—one having a temperature of about 106 and the other of 104½, (and our experience was that as a rule they did not live more than from eight to twenty hours after they were first noticed as being sick), and tried some experiments. I took an animal from a high pasture that had not been exposed to the same conditions and shut him up in a box-stall with these two sick animals until they died. I kept him confined there about twenty-four hours after the animals died, then removed the carcasses and buried them with lime and left him in the stable. He came away about the 15th day, and that animal is still alive and well. Of course, this is only one experiment, but I am inclined to believe that the disease is non-infectious and non-contagious, and it corresponds so closely with the postmortem lesions that Dr. Meyer describes as to lead me to believe that we have the same conditions in Michigan.

DR. KINSLEY: I have also been interested in Dr. Meyer's description and in Dr. Dunphy's. In the state of Missouri for some four years we have been having considerable difficulty with especially young animals shipped from our public stock yards for feeding and grazing purposes. It is not uncommon in September, October, November, and in fact, until the following May, to have reports of nearly every carload of cattle that goes through the yards, as being affected with what is ordinarily termed "infectious pneumonia". About four years ago I was asked by the state department to investigate this, and in four different herds on one trip I found a pneumonia of croupous type in which there was a marked interstitial exudate simulating in a way the picture of the lung from an ox affected with contagious pleuro-pneumonia, but the interstitial

serum was not the sort we find in that disease. In addition, we found pleurisy, associated with more or less hemorrhage of the serous membranes, and particularly of the epi- and endo-cardium. Sometimes we find the abdominal organs hemorrhagic. Usually if the animal lived three days or over after the infection, there is found a nephritis. If the animals have died soon after the infection is established, as they sometimes do in six or eight hours, we don't find nephritis. I have examined many of these specimens and in the first examinations I failed to isolate any organism except an organism that was evidently a contamination, but I found by taking my culture tubes to the carcasses, making the cultures direct from the lung lesions, especially pneumonic centers, I have had no difficulty in practically every case in isolating a bi-polar staining organism that quite promptly kills rabbits, and from the culture appearance and clinical manifestations, and all, we have called the condition hemorrhagic septicemia of the pectoral type.

We have had many cases of it. I recall one special instance in which there was some 120 three-year-old steers shipped from the St. Louis yards to central Missouri. Of this bunch, on the third day after shipping sixteen died, with several others sick. I think in all some forty head out of the 120 died. We have in other instances as high as a 50% loss, and usually that is of animals younger than these I mention—that is all yearlings, two-year-olds, and calves.

Following out the suggestion that was demonstrated by the Bureau of Animal Industry after the Yellowstone Park outbreak of hemorrhagic septicemia in buffalo, the state department asked me to attempt the preparation of a vaccine by the use of organisms isolated from various outbreaks in our state. This has been done, and whether it is a coincidence or not, I am not ready to say, for we are still in the preliminary work, only having carried on this work some two years and I do not feel like making positive statements, but all of the animals that have been immunized before shipping from the yards have not developed this disease. While others shipped the same day to the same communities, the same country stock yards, have had this disease develop and destroy anywhere from one to five or six per cent, and even as high as twenty per cent. And further, we have found, although that may also be a coincidence that by the injection of this material into the healthy animals in the herds in which we find these infected animals, there are practically no others which become infected. In other words, the disease ceased.

Now, this may all be a coincidence. I am not ready to make any positive statements, but I have been interested in this discussion because it is, or I believe it to be this same disease, with the one exception in the lesions. We have noted some liver lesions, but they are not at all constant. The principal lesions we find consist

of the pneumonic pleurisy, and if the animals lived long enough, so that there is a toxin, we find also a nephritis. I have found some instances in which there were liver lesions.

I would like to ask Dr. Meyer one question of the necro-bacillus: if I remember correctly, he said treatment with potassium iodide relieved this condition. Was it this particular condition?

DR. MEYER: It was this particular condition.

DR. EICHHORN: I was especially interested in the statement of Dr. Kinsley relative to his success in the bacterin treatment of the condition he has described. I am sorry I have not seen the publication of it.

DR. KINSLEY: It will come out in the Missouri reports. It was prepared about a month ago.

DR. EICHHORN: I was interested in the statements in regard to treatment of the disease. The first time we had occasion to apply it, as Dr. Kinsley mentioned, was an outbreak among the buffalo of Yellowstone National Park in 1911. A number of calves died from a mysterious disease and the local veterinarian who was sent there to investigate did not make a definite diagnosis but forwarded some material to Washington. We isolated the hemorrhagic septicemia organism, and as they had begged us to give them assistance in coping with this disease, a vaccine was prepared and forwarded there for the inoculation of the entire herd. Whether it was a coincidence, as Dr. Kinsley states, or whether it had real merits I am not able to say, but after the administration of the vaccine, not a single animal died. The results were so gratifying to the management of that herd that they requested us to prepare for them annually a vaccine from the same strain of organism, which we have been doing, and they have vaccinated the herds for the last four years, and they have not lost a single animal from that herd.

As to the disease Dr. Meyer describes in his paper, I think it is very interesting, and apparently from the discussion of Dr. Dumphy they have the same disease in Michigan. The feature which strikes me as particularly interesting, is that the organism does not appear to have the pathogenicity as in the various outbreaks of hemorrhagic septicemia. It would certainly be interesting to know whether vaccination against the disease would prove effective. I would like to ask Dr. Meyer whether he experimented with the administration of vaccine from the organisms he isolated, and what success he had with the same.

DR. SIMMS: Mr. Chairman, in the absence of Dr. Lytle, the state veterinarian of Oregon, I would like to say we have, apparently, the same disease in Oregon. I have not had a chance to make any microscopic or bacteriological examination, but the disease occurred in the mountainous section of the state where the cattle had

been upon swampy, miasmatic pastures in those sections, and it is certainly similar to the disease which Dr. Meyer describes.

DR. MEYER: I am certainly indebted to Dr. Dunphy for having mentioned that a disease similar to hemorrhagic septicemia exists also in Michigan. With regard to the pathogenicity of the organism to be isolated from such cases, I only want to recall the facts which have been brought out by Dr. V. A. Moore many years ago, that in absolutely healthy cattle bi-polar organisms can be found which are pathogenic to laboratory animals in the usual manner. This fact suggests that the demonstration of bi-polar organisms has to be properly controlled before it is of any value for the diagnosis. I felt this way particularly in regard to the two cases mentioned in my report. We know of diseases in which bi-polar organisms, originating probably from the respiratory tract, are frequently encountered in cultures from various organs, and yet they have nothing to do with the disease.

I have seen sporadic cases among cattle and other animals in which I isolated these bi-polar organisms, but by careful investigation it was found that quite different organisms were actually responsible for the disease. You all know the changes which have taken place in the last few years concerning our knowledge of the relation of swine plague to hog cholera. We have a filterable virus as the main cause; it reduces the resistance of the lung tissues so that the saprophytic bi-polar organisms can invade it and produce what we called "swine plague pneumonia".

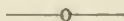
In pneumonia of calves, experience has taught us that bi-polar organisms can be the primary cause, and if, as Dr. Kinsley has demonstrated, the immunization is fully protecting against further occurrences, the proof of their being the etiological factor is apparently fully established. We have, however, to bear in mind that other organisms of the coli or paratyphoid groups are also responsible for pneumonia in young calves.

Further; we have to keep in mind that in many diseases of calves the primary test of infection is the intestinal tract. The subsequent weakening effect will have the same results as already cited in hog cholera. In such cases the immunization will be without results. The lesions of hemorrhagic septicemia, as we find them in postmortems, do not say anything whatsoever. The bleeding from the blood vessels, the diffuse hemorrhages, petechiae, and so on, in all the organs, prove nothing. They are only indications of the blood vessel injury which can be caused by various kinds of organisms from the toxins of the bi-polar organisms down to the filterable viruses. In hog cholera, in swamp fever, and in other diseases we have the picture of a hemorrhagic septicemia. The anatomical lesions of hemorrhagic septicemia represent only an existing condition, but do not indicate the cause of the same, and therefore are not a criterion for the diagnosis. The findings have to be sifted

bacteriologically down to the causal agent, and I am therefore as cautious and as careful as possible in making a final diagnosis, when the findings are not constant.

I would have been only too glad if you would have discussed more in detail the facts which I have presented to-day. The more we discuss these things, the more we assist each other, and reach an understanding.

With regard to the vaccination, I only want to add that I have begun in an experimental way to immunize against bi-polar infections: we have tested our vaccine, and have obtained no ill effects thus far. The experiment is in progress. I cannot say what results we will have in the field. In any case, I have no doubt that the immunization with vaccines is exceedingly promising. In our case it will be an experiment to establish a conclusive diagnosis and to eliminate all the other diseases which have had to be considered in connection with this fatal cattle disease.



PICTURES EXHIBITED BY DR. K. F. MEYER*

Dr. K. F. Meyers explained a series of photographs, drawings and charts collected by himself in South Africa illustrating mostly tropical diseases of animals, also a few very interesting pictures of rare pathological conditions observed in the United States. The list of pictures included the following subjects:

DISEASES DUE TO FILTERABLE VIRUSES:

- African horse-sickness.
- Bluetongue of sheep.
- Rinderpest.
- Epithelioma contagiosum.

PROTOZOAN DISEASES:

- Piroplasmosis of the horse and dog.
- Anaplasmosis.
- East Coast fever (a complete set of pictures showing the anatomy and parasitology of the disease).
- Trypanosomiasis of cattle, etc.
- Leishmaniosis of dogs and mice.
- Spirochaetosis of chickens.
- Sarcosporidiosis; so-called "Lamziekte".
- Chemotherapeutic effects of Salvarsan on *Tryp. brucei*.

*Section on Sanitary Science and Police, A. V. M. A., Oakland Cal., September, 1915.

MISCELLANEOUS:

Crotalism—a specific laminitis due to the poisoning with *crota-laria Burkeana*, so-called “Stijfziekte”.

Specific equine nephritis due to *B. nephritidis equi*.

Paratuberculosis of cattle.

Osteomyelitis in cattle due to *B. necrophorus*.

Osteoporosis of the horse.

Ghon-Sachs infection of the swine (specific gas phlegmon).

Sporotrichosis of domestic animals.

Tuberculosis in pigeons.

Ostitis deformans of the dog, etc.



PRELIMINARY REPORT ON THE CONGLUTINATION TEST WITH SPECIAL REFERENCE TO THE DIAGNOSIS OF GLANDERS*

C. P. FITCH, Ithaca, N. Y.

The diagnosis of occult glanders in certain cases is not an easy task. The more reliable tests which are used by veterinarians to diagnose this affection in the living animal are:—

1. Bacteriological examination of exudates and secretions for the presence of *Bact. mallei*. This should include animal inoculation.
2. The use of mallein.
3. The sera tests, including agglutination, complement fixation, precipitation and conglutination.

In this country the agglutination and complement fixation tests are in general use. Mallein is employed subcutaneously and ophthalmically. Yet cases constantly arise when the veterinarian is in doubt as regards the presence or absence of glanders. One cannot read the report of Pfeiler and Weber of more than seven thousand sera reactions without being impressed with the difficulties encountered in the diagnosis of glanders. As examples we quote from their report:—

Two horses imported from Russia to Germany gave the following reactions to the blood tests:

*Presented at the meeting of the A. V. M. A. Section on Sanitary Science and Police. Oakland, Cal., September, 1915.

	Agglutination	Complement fixation	Control c. f.	Conglutination
No. 1	1-300	0.2 incomplete	0.2 incomplete	—
No. 2	1-1000	0.05	—	+

No. 1 showed the presence of non-specific complement fixing bodies (as shown above). That is, the serum was anti-complementary, and according to the results of the agglutination and conglutination tests the horse was considered as not infected with glanders. This animal was exported to Denmark and was tested by subcutaneous mallein under the direction of Prof. Bang. The animal reacted positively and as a result of the test was slaughtered. A careful post mortem was made which showed the presence of some nodules in the lungs which were apparently due to strangles. In order to make sure, guinea pigs were inoculated with material taken from these nodules. These test animals did not become infected with glanders. Case No. 1 was apparently a non-glandered animal.

No. 2 gave a positive reaction to the agglutination and conglutination test. To the complement fixation test it gave what is usually called a "paradoxical reaction". That is as shown in the table the serum of this animal was positive in a quantity of 0.05 c.c. However, in larger quantities 0.2 c.c. and 0.1 c.c. (the usual amount tested) the reaction was incomplete or negative in each case. The controls did not show the presence of any anti-complementary substance. Depending on the results of agglutination and conglutination the animal was slaughtered and found to be infected with glanders.

The study of the conglutination test was taken up to determine first whether it was simpler than the complement fixation test and second whether it possessed any advantages over agglutination and complement fixation for the diagnosis of glanders.

The name "conglutination" implies two things. First the agglutination of washed red corpuscles and second, hemolysis of the same. It is based on the discovery of Ehrlich and Sachs who combined in a test tube the fresh blood serum of a horse, the inactive (heated to 56° C. for 1½ hour) blood serum of a cow and the washed red corpuscles of a guinea pig. An agglutination of the red corpuscles and hemolysis occurred. This phenomenon was studied further by Bordet and Gay and their interpretation is as follows: "When guinea pig corpuscles are added to a mixture of the two sera (*fresh horse serum and inactivated cow's serum*) they are affected by the sensitizer of the horse serum and to a certain

extent by the sensitizer in the heated bovine serum. This second sensitizer is, however, superfluous. Its presence is by no means necessary for the experiment. When this sensitization is effected the corpuscles are then in a condition to fix the horse alexin. This alexin, however, has only slight hemolytic power. But once the corpuscles have become sensitized and laden with alexin, they are modified in their properties of molecular adhesion to such an extent that they became able to attract the colloidal substance of bovine serum, which unites with them. The adhesion of this new substance produces two results: It causes the blood corpuscles to be more easily destroyed by alexin and also agglutinates them energetically. Consequently, a powerful clumping followed by hemolysis is observed". These authors call this substance present in the normal cow serum "colloide de boeuf" or as was afterwards designated "conglutinine".

The technic of the conglutination test is similar to that employed in complement fixation. In brief, it consists in combining certain definite quantities (previously determined by titration) of normal unheated horse serum, the inactivated blood serum from the animal to be tested and an extract prepared from *Bact. mallei*. Mallein has been used by some authors in place of the extract. These three agents are placed in the incubator for one hour. There is then added the inactivated cow's serum and the washed red corpuscles of the sheep (corpuscles from other animals may be employed) and the tubes are returned to the incubator for one to two hours and then examined.

If the serum came from a glandered animal the red corpuscles settle to the bottom leaving a clear fluid. If the serum came from an animal not infected with glanders the corpuscles are agglutinated in clumps and finally more or less hemolysis occurs and the fluid becomes red. Many variations in this technic are used by different investigators, the more important of which are (1) combining all the reagents at once and (2) allowing the tubes to remain at room temperature. If anyone wishes the details of the method followed they may be found in the reports of Pfeiler and Weber or in the Report of the New York State Veterinary College at Cornell University for 1914-1915 where they will be published in full.

The conglutination test has been employed by Gay and Lucas for the diagnosis of dysentery in man. It has been employed by several workers in the diagnosis of syphilis. Among these should be mentioned Stenge, Jakobaeus, and Siebert and Mironescu.

As previously mentioned conglutination was first employed for the diagnosis of glanders by Pfeiler and Weber in 1912 and reported by them in the *Berliner Tierärztliche Wochenschrift*. A little later the same year they reported in detail the results of testing 100 horses for glanders by the use of the agglutination, complement fixation and conglutination tests. These animals were divided into four groups. Group I was made up of forty-five animals, each test gave negative results and a careful physical examination failed to detect any symptoms of glanders. These were considered as sound animals. Group II likewise contained forty-five animals which were glandered according to the results obtained by the complement fixation and conglutination method. A careful post-mortem examination showed the lesions of glanders in each case. The agglutination method in 50% of these cases gave a reaction in a dilution of 1-400 up to 1-1000. The author states:—"Only for those not familiar with the technic of the agglutination method does this signify that agglutination has not picked out 50% of the glandered horses". Group III contained four horses. Two of these gave negative reactions to the agglutination and complement fixation tests. They were both positive to the conglutination test. These two animals were killed and carefully examined and old glanders lesions found in each. One of the other two horses reacted positively to the conglutination and agglutination tests, negative to the complement fixation test. This horse showed glanders lesions on post-mortem examination. The other horse gave a partial reaction to complement fixation (0.2) and a very slight reaction to conglutination. On post-mortem no lesions of glanders could be found. Group IV was made up of six normal horses which gave negative reactions to all the tests. These animals were then injected with mallein and after fourteen days the serum of each animal reacted positively to all the tests.

Stranigg working in Dr. Schnürer's laboratory in Vienna studied the conglutination test for the diagnosis of glanders. His conclusion is as follows: "The conglutination method gave reliable, definite and easily determined results in testing thirty-five glandered and forty-seven non-glandered horses".

Anderson, in Prof. Bang's laboratory at Copenhagen used the conglutination test in examining over two hundred horses for glanders. It was used in connection with the complement fixation and the subcutaneous mallein tests. At the conclusion of his work he

states:—"Although the results obtained by the complement fixation test are, very accurate, nevertheless I consider the introduction of the conglutination test a valuable addition to the sero-diagnostic methods of detecting glanders".

Michin, working under Pfeiler's directions tested about 200 horses by the conglutination method. Of this number 41 were glandered. He obtained excellent results with the test as proven by post-mortem examination. Reeser in Holland obtained good results in the application of conglutination.

In this country Wehrbeim at Ames, Iowa has used conglutination in the diagnosis of dourine. His conclusions are:—"The conglutination method can be used for the diagnosis of dourine; but it is more sensitive to faulty technic and hence more difficult to employ than the usual complement-fixation method".

We have been experimenting with the conglutination test for more than a year. During this interval over three hundred horses have been tested. The results obtained by the conglutination method have been compared with those obtained by complement fixation and agglutination. Mallein has been used both subcutaneously and ophthalmically in many of the cases. In about 10% of the cases the results of the tests have been checked by a post-mortem examination.

The results obtained by the conglutination method have in general been the same as those obtained by the other sera tests. Anyone familiar with the results of agglutination and fixation know that in many cases there are apparently wide discrepancies. If one studies these, however, and can get a full history of the case these apparent discrepancies are usually explainable. Similar apparent differences exist between the results obtained by conglutination and fixation although not as great. In several cases (12), however, positive results have been obtained by the conglutination test and negative results to both fixation, agglutination and mallein. In none of these cases have we been able to verify the tests by post-mortem examination. One horse reacted negatively to conglutination. Fixation, agglutination and mallein were positive and post-mortem examination showed the presence of glanders.

The preliminary work with this test has brought out certain things.

(1) The effect of the subcutaneous injection of mallein is shown by a positive reaction to the conglutination test later than

by the complement fixation test. On the other hand the positive reaction to conglutination following mallein is much more prolonged than to the complement fixation test. This is in agreement with the findings of Pfeiler and Weber who state that the longer interval is about one month.

(2) So far as we could judge the presence of the specific antibodies of the conglutination test were present as early after infection as those of the complement fixation test. This is in agreement with the work of Waldmann.

(3) The advantage which the conglutination test possesses for the diagnosis of glanders in asses, mules and certain horses whose blood contains non-specific complement binding bodies for glanders by the complement fixation method. The examination of the sera of these animals has always been attended with difficulty owing to the presence of the anti-complementary bodies. Various methods have been suggested for getting rid of these bodies especially the inactivation at a higher temperature (60 C°). This anti-complementary or inhibiting action of mule sera is not noted when the serum of the horse is employed as complement. This was brought out in the work of Schutz and Waldmann who recommended for the diagnosis of glanders in asses and mules a hemolytic system of (1) Complement from the horse, (2) Amboceptor from normal cow serum (3) Washed corpuscles of the guinea pig. This they call the "changed complement fixation test". It does not possess so far as we have determined any distinct advantages over the regular conglutination test which it resembles very closely. Pfeiler and Weber have very recently reported excellent results from the application of the conglutination test in the diagnosis of glanders in mules and asses.

(4) The conglutination test does not in every case give positive results in testing the serum of an animal infected with glanders. The percentage of failures, however, is very low. In our work about 0.5%. Failure to show the presence of glanders in certain cases seems to be inherent in any diagnostic method. As Pfeiler and Scheffler state in one of their latest (March 1915) publications on this subject: "Until a few years ago complement fixation was considered the best method for the diagnosis of glanders. Conglutination is likewise an excellent method. The introduction of this latter method showed that complement fixation does not allow the

determination of all cases of glanders. Likewise conglutination may fail in some cases''.

(5) The ophthalmic mallein test does not seem to influence appreciably the results obtained by the conglutination test.

(6) A slight variation in technic may give different reactions in testing the same sera. This is true with the complement fixation as well as the conglutination test. In the agglutination test the strains of *Bact. mallei* employed in making the test fluid often possess widely varying agglutinating properties and this may lead to variable results. There is great need for a standardization of the technic and the reagents employed in the different laboratories in carrying out the various biological tests.

(7) The conglutinating system is a delicate one and careful standardization is even more necessary with this test than with complement fixation. In our work when testing one lot of over seventy-five sera trouble was experienced with the system. Each reagent was carefully retitrated and the sera retested. Again very unsatisfactory results were obtained and the whole discarded. We have tried in every possible way to determine the cause of these failures but have been unable to learn the difficulty. The sensitiveness of this test has already been noted by Wehrbeim.

The conclusions which can be drawn from this work are:

(1) The similarity which exists between the complement fixation and conglutination tests. Both are relatively complex and while the reagents for conglutination can usually be obtained more easily than those for fixation, nevertheless the greater sensitiveness of the conglutination system offsets this advantage. Each method is about equally complex and difficult to carry out.

(2) The decided advantage which conglutination has over fixation for the diagnosis of glanders in asses, mules and those horses which have anti-complementary substances in their blood.

(3) No single sera test is infallible for the diagnosis of glanders. Each test has certain advantages which renders it of value in the diagnosis of this disease.

(4) There is need for a standard method for carrying out each test which shall be employed in the various laboratories. This would tend to reduce the number of discrepancies in the results obtained by the different workers.

The author wishes to acknowledge his indebtedness to Dr. J. B. Hardenburgh of the Pennsylvania Live Stock Sanitary Board

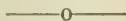
Laboratory who very kindly furnished a large number of sera for this work, also to Dr. W. W. Williams who assisted in carrying out the tests here reported.

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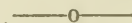
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ABSTRACT OF DISCUSSION.

DR. ———: I want to say a few words in regard to the conglutination test as we have employed it in connection with the diagnosis of glanders to a limited extent. Our object in undertaking this test was to determine the comparative value of this test as compared with the complement fixation and agglutination tests. On the whole I think the agglutination test gave the best results. The conglutination test was also quite satisfactory, as was the complement fixation, but the agglutination test was superior to the conglutination test. As Dr. Fitch states in his paper, there is no doubt that it would have an advantage in those cases where anti-complementary substances interfere with the test, but we appear to have overcome this difficulty by simple inactive serum mixed with a salt solution. In that way we get a quicker reaction, and even in cases where the reaction was indistinct, by the inactive serum and the salt solution we invariably got more pronounced and better reaction. This we also employ in the diagnosis of dourine, and also it was found that the reaction is very pronounced and the reading is more accurate than when the process is carried on without the salt solution.



A DISEASE RESEMBLING "FORAGE POISONING" IN HORSES AND MULES. WHEREIN OAT HAY INCORPORATED THE PRIMARY FACTOR

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In bulletin 167 of the Kentucky Agricultural Experiment Station there appears an account of a fatal disease which affected horses, mules and cattle in 1911 and 1912. The most pronounced symptoms were paralysis of the pharynx, incoördination of the voluntary muscles, with varied nervous manifestations, followed by general weakness, in which state the affected animals lay broad-

side for a few hours to two or three days, suffering intermittent muscular tremors before death. The corn in several outbreaks observed in 1911 was examined and found to be infected with fungi. An attempt to reproduce the disease by feeding mouldy corn failed, but notwithstanding the absence of experimental confirmation, mouldy feed was considered to be closely associated with the disease.

It seems quite probable from the clinical symptoms of this disease that it bears a close similarity to a more recent outbreak in Central Kentucky. In January of this year (1915) our attention was called to a fatal disease among horse and mule stock on the Griffith stock farm near Lexington, wherein it was found that losses totalled approximately twenty head during a period of four months. The majority of these animals succumbed during a period of thirty days. The following symptoms were observed in affected animals: dull, languid appearance, partial paralysis of the pharynx, salivation, marked weakness, as evidenced by unsteady gait, and various nervous manifestations, followed by prostration in six to eight hours. An animal once down was unable to rise unassisted, and death followed in twelve to sixty hours. Of all animals affected only two survived. These two animals were placed in slings and by careful nursing gradually recovered after a period of sixty days.

Autopsy and gross observations on animals naturally as well as experimentally affected did not reveal any signal changes upon which a diagnosis might be based. The macroscopical lesions observed in afflicted animals consisted of injection of the capillary blood vessels; the mucosa of the stomach and intestines contained scattered petechial hemorrhages, quite pronounced in some animals, yet scarcely perceptible in others. The same condition prevailed in the serous membranes of the body. The contents of the small intestines and stomach were generally of a fluid nature and occasionally of a greenish color, while impaction was frequently found in the colon. The lungs were, without exception, congested and sub-pleural hemorrhages were found.

A diagnosis of forage poisoning was made by Dr. E. R. Mumma of Georgetown, Kentucky, Dr. S. F. Musselman, State Veterinarian, and by Drs. W. H. Simmons and O. S. Crisler of the Experiment Station staff and the authors. On examination the corn was found to be infected with fungi, but we were informed by assembled farmers of the community that similar tainted corn was being fed

by other stockmen in the immediate locality with no ill results. However, our previous experience with a similar disease led us to suspect the corn.

Later reproduction of the disease experimentally in horses should classify the disease in question primarily as a forage poisoning, until more definite information regarding the etiology of similar diseases is obtained, as the oat hay on this farm when fed to experimental animals, independent of other feeds on the premises, resulted in clinical manifestations of the disease. Oat hay or sheaf oats, as it is sometimes called, is fed extensively on Kentucky stock farms to this class of live stock. There has been very little or no evidence in our observations heretofore that this feed might in some cases incorporate the fatal factor which is responsible for losses to the horse and mule industry of our State. A correct diagnosis and the establishment of the feeds involved is therefore of the greatest importance, as there is scarcely a month during the winter season that losses from this disease are not reported.

It seems quite difficult to make a differential diagnosis of Cerebro Spinal Meningitis (Forage Poisoning) Mohler¹, Cerebro Spinal Meningitis (Encephalitis), also known by some as "Kansas horse disease", Udall², Meningo-Encephalitis (Blind Staggers) Haslam³, Encephalo-Myelitis, Stange⁴, Epizootic Cerebro Spinal Meningitis, Hickman⁵, and true forage poisoning, Pearson⁶, as occurring in various parts of the United States, and of Borna's disease, Hutyra and Marek⁷, as occurring in Europe. "Forage poisoning" according to Pearson is a disease resulting from ingestion of an infective agent incorporated in the feed, wherein there exists an inseparable relation between the feed and the poisonous material. Though it seems to be true that this relation cannot always be established, there is no conclusive evidence that such a relation might not exist. Udall's observations in Kansas, like Milks⁸ in Louisiana and Williams⁹ in Idaho, concluded that the evidence gained in their studies would not justify the association of a similar disease with a specific contaminated feed, in the sense that Pearson implied. In this connection our attention was forcefully called to the fact that it is possible for apparently clean, bright feed to produce a fatal disease resembling forage poisoning, suggesting the possibility that forage and grain contamination is not always associated with visibly mouldy or inferior feedstuffs. Prof. E. J. Kinney, Associate Agronomist of the Experiment Station, examined

the oats containing the poisonous agent and pronounced them to all outward appearances of first rate quality. Chemical analysis of the nitrogen content by Prof. E. H. Nollau, Assistant Research Chemist, indicated that the analysis of these oats did not vary

CHART A

DISTRIBUTION OF NITROGEN IN PERCENT.

	WHOLESOME NORMAL OATS	GRIFFITH'S OATS
Ammonia N	13.31	13.80
Melanin N.....	2.97	1.18
*Cystine N	4.48	2.43
Arginine N	11.42	11.40
Histidine N.....	9.58	7.18
*Lysine N .....	.....	2.48
Amino N, filtrate (1).....	43.49	44.57
Non amino N, filtrate (2)	11.07	17.28

(1) Mono-amino-acids.

(2) Proline, oxyproline, etc.

*There is possibly a slight error in the cystine determination, in which the cystine is too high and the lysine correspondingly low. The absence of lysine in normal oats has not been definitely proved.

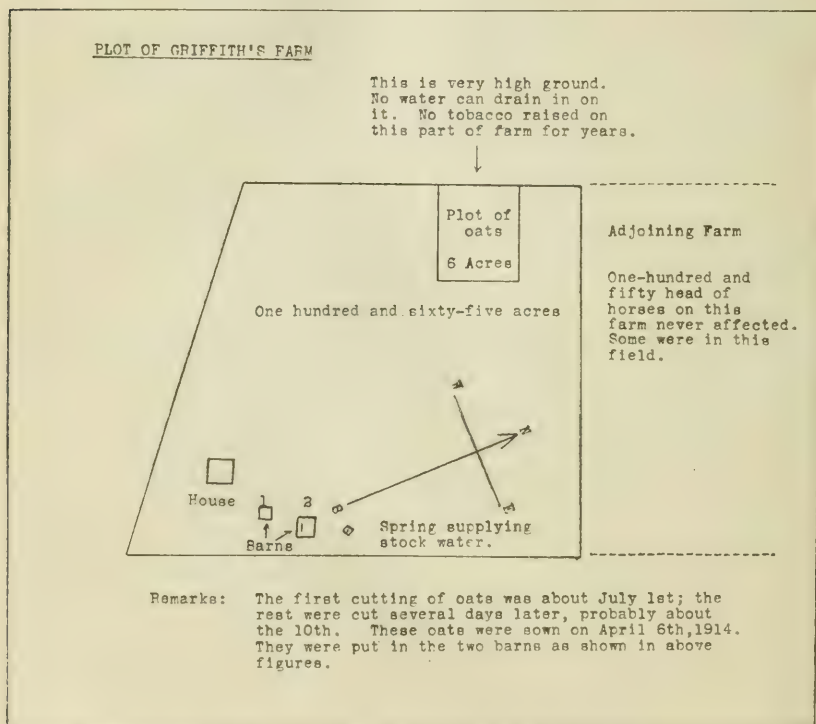
markedly from that of wholesome oats (see Chart A). Disregarding the possibility of spoiled feed, it is suggestive that conclusions from physical examination are not always to be relied upon, even if feed of a visibly inferior quality (infected with moulds) constitutes a portion of the ration.

DIFFICULTY SOMETIMES ENCOUNTERED IN DETERMINING FEED INVOLVED. We have made observations on three farms this year in addition to the one described herein, where a disease resembling forage poisoning existed. The history and symptoms of afflicted animals were indistinguishable from the disease occurring on the Griffith farm as produced by the oat hay. Feeding experiments conducted with the various feeds from these farms resulted negatively. In such cases it is probable that only a limited amount of feed might contain the fatal material, or a marked tolerance to the same might prevail in some animals. The fact that some animals are markedly resistant is illustrated by one of our experimental horses, which ate heartily for thirty days of oats from the Griffith farm without fatal results. This animal evidenced a very sluggish attitude on or about the tenth day, but recovered and remained apparently healthy during the remainder of the experiment. This

animal was a hearty eater and consumed approximately ten times the quantity of oats consumed by any one of the other experimental animals. In all experimental horses, with this one exception, the feeding of the oats terminated fatally.

HISTORY OF THE OATS. In connection with this outbreak it was found that the seed of these oats was originally purchased from a local seed store. No doubt other farmers received oats from this lot, though this information could not be definitely determined. They were sown on April sixth, 1914, in a six acre field, on the highest ground on this farm, as indicated by Chart B. They made a

Chart B



normal growth and were cut when medium ripe and harvested on the fifth of July. A hay mower was used to cut this grain and it was handled as ordinary hay. It was placed in barns Nos. 1 and 2. Barn No. 1 is small and from the supply placed in this barn the driving horse was fed throughout the winter with no ill effect. The oats placed in barn No. 2 were for general use, and late in the

fall were fed to the horse and mule stock. This barn was accessible to chickens and some had made use of this loft as a roosting place in preference to the regular quarters provided for the poultry on this farm. Chickens could not gain access to barn No. 1.

METHOD OF DETERMINING FEED INVOLVED. The ration fed to the horse and mule stock on this farm consisted of ear corn, corn fodder, clover hay and oat hay, with water from a nearby spring. Of these feeds the ear corn was suspected, and in order to prevent further losses it was considered advisable for the owner to discontinue feeding it. These instructions were carried out faithfully, and on the strength of the mouldy corn being responsible for the disease, a team of mules was purchased for ordinary farm work. They received the feeds mentioned above with the exception of the corn. One of the newly purchased animals was found in a dying condition on the sixth day after delivery to the farm, and on the fourteenth day the other animal was down, indicating that the corn was not primarily involved in these losses as we had originally supposed. In order to determine if any feed could be incriminated, and if so which one was associated with the disease, two horses (No. 1 and No. 2) were purchased and placed in small barns used for the housing of farm implements, neither of which had been used as horse or mule stables on the farm.

Horse 1 (see Chart 1) was allowed shelled corn and clover hay. The water supplied consisted of a watery extract of the corn made by immersing two bushels of this shelled corn in a barrel of water. This was placed in the stall and made available to the animal at all times. No record of the amount of feed and water consumed was made, but it was aimed to supply same in such quantities as would be consumed by the animal each day. On the second day of this experiment one of the farm mules belonging to the owner was found to be acutely ill, presenting symptoms similar to those observed in animals previously afflicted. At this time it was considered advisable to determine if the blood of an animal in a moribund condition would transmit the disease if injected into healthy horses. A transfusion from the jugular vein of the afflicted animal (mule 15) to horse No. 1 was made. For twenty-eight days following this and thirty days following the feeding of the corn and clover and the drinking of the watery extract of the corn, no change in the condition of the animal was manifest. (Chart 1).

CHART 1.

HORSE No. 1.

DATE	PLACE	FEED	Temperature	SYMPTOMS
March 10	Griffith's Farm— Box stall in which no horse or mule stock had been placed for several months.	Shelled corn and clover hay. Watery extract of corn to drink. Water from cistern near house; had not been used heretofore for stock purposes.	N	None observed.
March 11	“ “	“ “	N	“ “
March 12	{ Injected intravenously with 5 c. c. blood from mule in moribund condition, found naturally affected on this farm. }		N	“ “
March 13	“ “	“ “	N	“ “
April 10	“ “	“ “	N	“ “

DISCUSSION: No evidence was obtained that these feeds, i. e. corn or clover hay, which were being fed to the horse and mule stock on this farm, were deleterious to this animal.

Horse No. 2 (see Chart 2) was allowed an exclusive ration of oat hay, which was supplied as rapidly as consumed, and a watery extract of the oat hay to drink, made by placing the hay in a barrel and filling it with water.

On the second day this animal was injected with 5 c. c. of blood drawn from mule No. 15 in a moribund condition. There was no change in the method of feeding as outlined for horses 1 or 2 following the injection. On the morning of the second day following the blood injection, horse No. 2 was dull and sleepy. A nasal discharge was observed, which the owner stated was quite characteristic of the early stages of the disease as observed in animals naturally affected on the premise. The next morning the animal was down and unable to rise. The following day it was destroyed in a dying condition. This seemed to narrow the problem down to two things, i. e. the oat hay or contagion as a result of blood injected.

Horse No. 3 (see Chart 3) was placed in a paddock adjoining the regular horse barn and was given oat hay each day. For drinking water this animal had access to the spring from which the horse and mule stock on this farm had been previously supplied. This animal was not accessible for examination from day to day owing to lack of previous handling. On the seventh day horse No. 3

CHART 2.

HORSE No. 2.

DATE	PLACE	FEED	Temperature	SYMPTOMS	
March 10	Griffith's Farm— Stable in which no horse or mule stock had been placed for several months.	Oat straw hay; wa- tery extract of same to drink. The water was obtained from cistern near house; had not been used heretofore for stock purposes.	N		
March 11	“ “	“ “	Normal temperature as recorded each day by owner.		
March 12	{ Injected with 5 c.c. blood intravenously from mule in mori- bund condition, found naturally affected on this farm. }				
March 13	“ “	“ “			
March 14	“ “	“ “		N	Slight nasal dis- charge of a mu- cous nature.
March 15	“ “	“ “			Animal down in morning and unable to rise. Increased res- piration. Inter- mittent move- ment of the legs as if running.
March 16	“ “	“ “			Destroyed.

DISCUSSION: This animal evidenced symptoms similar to animals naturally affected on this farm, and narrowed the problem to the possibility of contaminated oat hay or the transmissibility of the disease by blood inoculations. Inasmuch as Horse No. 1 was inoculated with blood from an infected animal with negative results the suspicion was cast on the oat hay.

could be approached and to all appearances seemed very tired and depressed. The following day this animal was down, unable to rise, and was later destroyed. This result further incriminated the oat hay, yet it did not remove all possibilities of infection, as the water supply was common to all naturally affected horses and mules, and the possibility of stable or pasture infection still remained. It was suggestive, however, in that two experimental animals receiving the oat hay in question under somewhat different conditions succumbed, as it was first thought this feed was entirely foreign to the original losses on this farm,

CHART 3.

HORSE No. 3.

DATE	PLACE	FEED	Temperature	SYMPTOMS
March 13	Griffith's Farm— Blue grass paddock.	Oat hay and water from spring which supplied horse and mule stock on this farm.	Not taken.	
March 14	" "	" "		
March 15	" "	" "		
March 16	" "	" "		
March 17	" "	" "		
March 18	" "	" "		
March 19	" "	" "		Depressed.
March 20	" "	" "		Animal unable to stand; increased respiration; severe bruises about head and feet, self inflicted. Muscular tremors. There was a very disagreeable odor from this animal. Destroyed.

REMARKS: The moribund condition of this animal incriminated more strongly the oat hay which was being fed on this farm, but it did not exclude the possibility of premise infection, as animals had previously succumbed to this disease while pasturing in this paddock and upon receiving the same water supply.

AVOIDING PREMISE INFECTION. In order to obtain further evidence of the incrimination of the oat hay and at the same time exclude all possibility of premise infection, the oat hay was delivered to the Experiment Station farm where it was fed to three experimental horses C, D, E, (see Chart 4). In addition to the oat hay, water was given these animals from a twenty gallon earthen container, in the bottom of which was placed oat hay. This feed and water were supplied in the quantities desired by each animal from the beginning of the experiment, and no inclination on the part of any animal to discriminate against the oat hay or water was observed.

As controls, an experimental horse F (see Chart 4) was placed on the Griffith farm and stabled in the horse barn (barn No. 2) where animals had naturally succumbed. This animal also had

the run of a paddock in which other animals had become naturally affected. The water supplied this animal was from a spring which had been the source of water for all horse and mule stock on this farm. The feed consisted of clover hay from the Experiment Station farm.

CHART 4.

METHOD OF DETERMINING FEED INVOLVED

Place.	Experiment Station.												
Animals.	Horse C. Horse D. Horse E.												
Feed.	Oat hay as received from Griffith's Farm, and watery extract of same to drink.												
Temperature.	HORSE C	Mar.	10	11	12	13	14	15	Moribund condition. Destroyed.				
			98.2	98.2	98.4	97.2	98.6	97.8					
	HORSE D	Mar.	23	24	25	26	27	Moribund condition. Destroyed.					
			99.9	98.	100.	0.3	98.						
	HORSE E	Mar.	28	29	30	31	Ap. 1	2	3	4	5	6	
			99.2	97.8	98.0	99.1	99.3	98.2	99.2	98.1	99.4	97.4	
Apr.		7	8	Moribund condition. Destroyed.									
		98.3	98.1										
REMARKS: Horses C, D, E evidenced symptoms observed in animals naturally affected in this outbreak. The water given animals to drink, in the form of extract of oats, had been used for horse and mule stock on the Experiment Station farm, thereby excluding the water as a factor. These animals appeared normal until the day before they were down and found in a moribund condition.													
CONTROLS.	HORSE F March 10—April 20 MULE A												
Place.	Griffith's Farm; in stall and paddock where horses had been stabled, later died, evidencing characteristics of the disease.						Experiment Station Farm, in stall adjacent to Horse E, with no partition. Halter tied so that mangers were entirely separated, allowing no interchange of feed.						
Feed.	Clover hay from Experiment Station farm.						Clover hay from Experiment Station farm.						
Water.	Water from spring which had supplied horse and mule stock of this farm.						Farm water as used for horses C, D and E.						
REMARKS: Horse F and Mule A remained healthy to all appearances during this time.													

Mule A was placed in an adjacent stall to horse E, with no partition between. Horse E was being fed the oat hay in question (see Chart 4). Horses C, D, E receiving oat hay all succumbed, while the controls, horse F and mule A, remained healthy, indicating that the disease in question was a true forage poisoning, not transmitted by contact but through the ingestion of this feed only.

GRAIN AND STRAW INCORPORATED PRIMARY CAUSE. Having once established evidence that the causative agent of this outbreak was associated with the oat hay, the part of the oat hay incorporating the primary factor, i. e. the grain or the straw, was sought. To prepare for this it was necessary to thrash the oat hay and separate the grain from the straw. This was first accomplished by whaling on a tarpaulin, but later a threshing machine was employed so that larger quantities of the grain might be made available. One horse was fed the straw, another was fed the grain. Each developed symptoms of the disease, which terminated in a moribund condition.

SUSCEPTIBILITY OF DIFFERENT ANIMALS. If some of the smaller animals could be proved susceptible to this condition, the further study of the disease experimentally would be greatly facilitated. To this end, two horses, a goat, a sheep, a pig, a rabbit, a guinea pig and a white rat were inoculated intravenously and subcutaneously, as indicated in Chart 5, with blood drawn from experimental horse No. 2 when in a moribund condition. The results of the inoculation proved negative.

The grain portion of the oats was fed to hogs, supplemented with corn meal, to white rats, supplemented with milk, and exclusively to sheep, goats, rabbits, guinea pigs and chickens. The results of this experiment (see Chart 6) were negative, thus ending the possibilities of making further observations on smaller animals by the methods described.

FOREIGN MATERIAL IN OATS. Following the threshing of the oat hay, considerable quantities of dried chicken excreta were found in the grain. Evidently this material distributed through the oat hay had been shaken from the straw and allowed to accumulate in the grain during the threshing process. An inspection of the oat hay before threshing revealed only occasional contamination of this material. On passing through the fanning mill to obtain the threshed grain free from all foreign material, the relative quantity of foreign material, including dried chicken fecal excreta, was found to be greater than had been expected. The possibility of this mater-

CHART 5.

COMMUNICABILITY OF THE DISEASE

TEMPERATURE									
Place	Animals Inoculated	Source of Blood	Date 1915	Horse A	Sheep	Goat	Pig	Horse B	
Experiment Station	Intravenously	Drawn from Horse No. 2 when in moribund condition.	Mch. 17	98.2	2.	2.1	1.3	99.	
	Horse A—5 c. c.		18	99.	2.	2.1	3.	98.2	
	Horse B—5 c. c.		19	98.	2.3	2.	3.4	100.	
	Goat—5 c. c.		20	100.	3.1	2.	4.2	100.	
	Sheep—5 c. c.		21	100.	2.1	2.2	1.2	99.2	
	Pig—5 c. c.		22	100.	2.4	2.3	1.4	99.3	
	Rabbit—2 c. c.		23	97.2	3.4	2.	1.2	98.6	
	Subcutaneously		24	98.	2.4	2.3	2.	99.	
			Guinea Pig—2 c. c.	25	97.2	3.1	2.4	2.	99.3
			White Rat—1 c. c.	April					
				10	98.4	3.2	2.2	2.	98.1
				11	99.2	2.	2.	2.1	99.

REMARKS: The animals indicated above showed no ill effects from the injection of the blood, indicating that the disease was not propagated in the blood nor transmissible by inoculation to these animals.

SUSCEPTIBILITY OF OTHER ANIMALS TO OATS WHICH PRODUCED
DEATH WHEN FED TO HORSES.

Place	Feed	Animals	TEMPERATURES							Symptoms
			Date	Pig	Pig	Date	Sheep	Goat		
			1915	6004	6019	1915				
Experiment Station	Oat grain, oat straw, hay and watery extract of same to drink.	Pig 6004	Mch. 7	2.4	2.2	April 1	2.	3.	None observed	
		Pig 6019	8	4.3	1.2	2	2.	3.	" "	
		Sheep	9	1.6	2.6	3	3.	2.	" "	
		Lamb	10	3.	1.	4	2.2	1.1	" "	
		Goat and Kid	11	2.4	1.	5	2.	1.3	" "	
		Two Rabbits	12	2.5	2.1	6	2.4	1.3	" "	
		Two Chickens	13	3.4	4.1	7	3.	2.3	" "	
		Four White Rats	14	3.4	3.3	8	2.3	1.4	" "	
		Four Guinea Pigs	15	4.1	3.2	9	2.3	2.1	" "	
			16	4.4	3.5	10	3.	2.4	" "	
			17	3.1	2.4	11	2.4	2.3	" "	
			18	3.5	4.2	12			" "	
			19	3.4	3.3	13			" "	
			April 1	2.4	2.1	26	1.3	2.2	" "	
			2	4.2	3.1	27	2.4	3.1	" "	
			3	4.4	3.5	28	2.2	2.3	" "	
			4	3.4	3.1	29	2.1	2.2	" "	

REMARKS: It was necessary to supplement the oats with bran and corn meal when fed to pigs, as the exclusive feeding of oats resulted in malnutrition. No change could be noted in the small animals as the result of eating the oats.

ial lowering the vitality of animals receiving the oats was not questioned, but it was thought advisable to determine if it incorporated the primary factor exclusive of the oats, by feeding same disguised in wholesome feed to an experimental horse. On the fourteenth day this animal evidenced symptoms as observed in other afflicted animals.

An explanation of the relation of this material to the oats is not attempted, but it is important that chicken excreta found in feed when fed to horses produced symptoms similar to those evidenced by horses fed the oat hay in question. The supply of this material gathered from the oats was limited and did not permit of further experiment.

The feeding of dried chicken and pigeon excreta from other sources, disguised in wholesome feed, resulted negatively in experimental horses. The excreta of chickens fed exclusively on the Griffith oats, disguised in wholesome feed, resulted negatively when fed to experimental horses, as well as the dried contents of the intestinal tract, brain and liver of horses fatally affected as the result of eating the Griffith oats. (See Chart 7). The carcass of

CHART 7.

NO EFFECT EXHIBITED BY HOGS EATING CARCASS OF
HORSE AFFLICTED WITH THE DISEASE

DATE	PLACE	FEED	ANIMALS	SYMPTOMS
1915				
March 15	Griffith's Farm	Carcass of horse No. 2; and corn.	Twenty shoats weighing from fifty to one-hundred pounds.	None observed.
March 16	"	"	"	"
April 5	"	"	"	"

REMARKS: During the time the fleshy portion of the carcass was being consumed no ill effects were observed. At the end of twenty days the carcass was completely consumed except the bony skeleton. The corn which was fed to the hogs in connection with this carcass, was from the same lot which had been given to horse and mule stock, as well as experimental horse No. 1.

one horse was consumed by twenty thrifty shoats with apparent relish, followed by no noticeable change in the health of the hogs.

Since these observations, State Veterinarian Musselman investigated an outbreak of a fatal disease in horses resembling forage poisoning, wherein chicken fecal excreta seemed to be involved. On

visiting the farm where horses had died, he found two animals affected. Two barns for storing feed and housing the horse stock were in use, which we will designate as barn A and barn B. The feed from barn A was hauled to barn B for feeding the animals stabled therein. No sickness was observed in barn A which originally stored all the feed, but feed from this stable seemed to be responsible for a disease resembling forage poisoning occurring in barn B. It was later found, after careful inspection, that barn B had been used for housing chickens and that large quantities of chicken excreta still remained. In placing the feed in the mangers, indefinite amounts of this litter were unavoidably included. The type of the disease as observed by Musselman in the two animals affected and as described by the owner and the local veterinarian in previously affected animals, resembled so-called "forage poisoning." The local veterinarian in charge designated the condition as "a paralysis of the throat."

The possibility of chicken excreta contaminating feed to the extent of resulting fatally when fed to stock is not a serious problem on well managed farms, but it seems worthy of more careful observations in connection with fatal diseases of horses and mules where in symptoms resembling forage poisoning are manifest, in order to determine the relation existing therein.

CONTAMINATED WATER AS A FACTOR. It is not known just what role farm water supplies might play in this disease. To obtain evidence of the possible danger of feed contaminating water supplies, the cleaned threshed oats were placed in cotton bags in the bottom of a twenty gallon earthen container and covered with water. Fresh oats were supplied every third or fourth day and the water replenished as consumed by the animal. From this jar horse No. 4 was allowed to drink, receiving corn meal, wholesome oats, and clover hay as a ration (see Chart 8). A period of twenty-three days from the time the watery solution was first allowed elapsed before any symptoms were manifest. On the twenty-fourth day the animal appeared very weak and incapable of standing, presenting symptoms similar to animals previously affected.

POISONOUS FACTOR IN OATS NOT TRANSMITTED FROM ONE GENERATION OF THE PLANT TO THE NEXT. To determine if the poisonous factor in the oats was propagated in the germ cell of the grain, three plots of ground 50x100 feet were prepared and sown. To all appearances these oats made a normal growth, and when ripe were

CHART 8.

CONTAMINATED WATER AS A POSSIBLE FACTOR IN FORAGE POISONING.
HORSE NO. 4.

PLACE	DATE	FEED	WATER	SYMPTOMS
Experiment Station	April 13	Corn meal; clover hay from Experiment Station Farm	Water in which oats had been soaked.	
	May 6	"	"	Animal dull.
	May 7	"	"	Animal down and unable to rise.

REMARKS: The poison was probably taken into the animal's system through the drinking water. This animal ate and drank heartily until the evening of May 6th, when it appeared dull. Was unable to stand the following day.

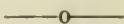
cut with a hand scythe. They were fed to an experimental horse daily over a period of four weeks, supplemented with corn meal. No ill effects noted, suggesting that the primary factor in the original oats is not transmitted to the next generation. The remainder of this crop of oats will be fed during the month of January in order to duplicate as nearly as possible the time elapsing from harvest until the original oats were fed with fatal results.

CONCLUSIONS

It is evident from these observations that a particular lot of oat hay was responsible for the outbreak of "forage poisoning" occurring on the Griffith farm and that this disease could be induced in experimental animals (the horse) by the feeding of this material to experimental animals over a period of time which resembled in a measure the incubation period of some infectious animal diseases; also that drinking water contaminated with these oats resulted fatally when given to experimental animals. Other animal species, i. e., guinea pigs, rabbits, chickens, swine, white mice, goats and sheep, were apparently non-susceptible. It is of interest to note that the oat hay responsible for this disease, though apparently clean, was later found to be contaminated with the excreta of chickens, which on being fed disguised in wholesome feed resulted fatally. Up to this time, however, we have not been able to isolate the causative factor of the disease occurring as a result of feeding this particular lot of oat hay, nor have we been able to show that oat hay from other sources produces "forage poisoning" in horses and mules.

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OF INTEREST TO SOUTHERN PRACTITIONERS

H. B. F. JERVIS, Columbia, S. C.

On settling in the "Sunny South", for practice, I was almost at once confronted with the so-called "black-tongue" of canines. I had heard of, and had frequently read, in the various journals, accounts of this dreaded malady, but since last Spring seeing an article from Florida attributing the cause of this disease to the hook worm, I had supposed that I would find that the disease was well in hand.

On getting my first case, I naturally made a microscopic examination of the feces for hook worm ova, but failed to get any results, and I may say in many subsequent searches I have also failed to find any semblance of one. Though many veterinarians, and many Doggie M.Ds. were using thymol, and in a few instances claiming results; the fact of finding no ova headed me off from that track altogether. I must make admission that quite a few of my earlier cases died, and that promptly, but that left me the privilege of several autopsies, and I was only too glad to take advantage of them.

I will here state that my experience has been confined to the immediate vicinity of Columbia, S. C., and I will here relate the symptoms as met with here.

SYMPTOMS. Marked lassitude and general malaise, complete inappetence, temperature usually sub-normal, occasionally normal, but never above normal. Blood-stained fluid feces, passed with great evidence of pain, very marked fetor *ex ore*, a peculiar con-

dition of the skin, best described as paper skin. If one takes up a hand full of skin, instead of the normal elasticity, one finds that the fold of skin so taken up remains wrinkled for some time, only slowly going back to its normal position.

One other symptom first called to my attention by a southern colleague, was when the disease is said to be confined to the intestines; on passing one's thermometer into the rectum, on removal it is blood-stained. This is a fair description of the general symptoms met with here.

Until recently, I had seen no cases of black-tongue with lesions in the mouth, and was beginning to be quite disappointed, until one day a client of mine, Mr. J. C. D., for whom I had treated a case of the intestinal form, and the dog made a recovery, rang me up saying that he had another dog taking the black-tongue, and would like me to come to his house at once.

On arrival, I found a well bred pointer bitch, mother of the one which had recovered, decidedly ill, refusing all food, and giving off the most vile odor that one can imagine. Long strings of saliva were hanging from the angles of the lips, and on examining the mouth I found great streaks of the gums were in the process of sloughing; the tongue was intensely inflamed, and great patches of it were beginning to slough. The bitch showed every symptom of absorption, terrible fetor *ex ore*, emaciation and weakness. The bitch posted on to a quick finish, and died in forty-eight hours. Just before she died, the owner brought me his third and last dog showing exactly the same symptoms, though perhaps not quite so bad as the bitch was at that time, but afterwards proving just as bad a case.

On getting the bitch over to my place, the first thing I did, was to get hold of a colleague of mine, and get his opinion on the case, as I had already formed an opinion that here we had an entirely different condition to the former cases of black-tongue, confined to the intestinal tract, and felt sure that this case, showing these mouth lesions, was a condition with which I was quite familiar, having met with it sporadically, not only in the frigid zone of Aroostock County, Maine, but also in England and Canada, and this condition is nothing else but the "Necrotic Stomatitis" of the various text-books. My colleague at once made the diagnosis of black-tongue, and several of the Doggie M.Ds., also made the same diagnosis, saying, "There is a real old fashioned case of black-tongue

so well known in the southern states." In spite of this positive stand taken, I kept to my opinion, and I may say that my opinion is the same to-day and that this so-called black-tongue is nothing else than the well known "Necrotic stomatitis" of canines.

POST-MORTEM FINDINGS. On those dogs afflicted with the so-called intestinal form of black-tongue, the following lesions were invariably present:—marked inflammatory changes in the alimentary canal; the mucous membrane of the stomach, and the entire intestinal tract is swollen, and its surface shows numberless hemorrhagic spots varying from a pin's head up, and the presence of a profuse dark brown colored mucus is noted. Most of the organs are markedly hyperemic. The mesenteric glands are swollen and show hemorrhagic centres. This set of symptoms compares very vividly with those recorded by Huttyra and Marek, under canine typhus, or gastro-enteritis hemorrhagicum, and by Law, Vol. II, p. 256, under hemorrhagic gastro enteritis of dogs.

On those cases showing the so-called black-tongue, with lesions confined to the mouth, a complete absence of any of the former lesions is noticed, and one merely finds the following:—the region of the gums is of a dark red, brownish or purplish hue; the entire tissues of the mouth assume a spongy condition, and before death bleeds very easily on pressure. The affected parts, take on later a yellowish hue, and the superimposed parts are found to be of a soft jelly-like consistency. On peeling this off from the diseased gums, etc., one finds a large ulcerous area, with irregular and jagged edges. This compares very favorably with the symptoms of stomatitis ulcerosa, necrotic stomatitis, ulcerative stomatitis of carnovira, etc., variously recorded by Law and others.

"I will now drop the term "intestinal form of black-tongue," and from now on will speak of it as "hemorrhagic gastro enteritis of dogs." In all my cases of gastro enteritis of dog cultures upon agar and blood-serum, proved negative, giving no growth whatever from heart's blood or any of the organs. In cases of necrotic stomatitis, I got a pure culture of *Staphylococcus pyogenes aureus* from the mouth, though I can quite conceive that in some cases one might get cultures of the *Bacillus necrophorus*, or in fact any other organism, but in my cases it has happened to be the staphylococcus.

CAUSES. (Gastro-enteritis canum) These are not very well known, but Law looks upon the cause as a poison, probably of the nature of a toxin or toxins taken with the food or water,

STOMATITIS ULCEROSA. Saunders says this condition is generally seen in old, debilitated dogs, and in weakly, anemic and pampered dogs of all ages. My experience has been that one meets with it in dogs of all ages, sorts and conditions. I have seen it in the pampered dog; the out-door farm dog and the lap dog in northern Maine. In the South, it has been mostly in hunting dogs, owing chiefly to their predominance above other kinds in this section. Law gives as possible causes, general lowering of health, in connection with privation or disease, especially distemper, etc. Superadded to all these, is the bacterial infection of such diseased parts, through which the ulceration is started, maintained and extended. This infection not being that of a specific organism, but usually of a multiplicity of the organisms that live in the healthy mouth, taking the occasion of the existence of a wound, or a reduction of vitality to colonize the mucosa which would have otherwise remained sound.

TREATMENT:—(Gastro-enteritis canum). In my hands, disinfection of the intestinal tract, with the usual intestinal antiseptics has proved a dismal failure. I would like to state here, that my experience with flushing out the entire alimentary canal, much as it would seem to be indicated, has been absolutely of no avail, and in every instance in which I have employed this method, I have always wished that I had refrained from its use. The patient always seemed to race on to the finish after its use, never seeming to recover from the marked exhaustion following this procedure.

It occurred to me that here was a condition in which the well known Bulgarian bacillus was indicated. The *Bacillus bulgaricus* was first isolated in Massol's laboratory, after which it was brought to the attention of Metchnikoff, who quickly foresaw its possibilities and popularized its use, both as a hygienic aid and a therapeutic agent of vital import. There are two varieties known as Type "A", and Type "B". Type "A" seems to produce better results in a clinical way. Let us dwell for a moment upon the biology of this organism so that we can the better understand it.

The *Bacillus bulgaricus* is one of the lactic-acid ferments, producing a very much higher percentage of lactic-acid than does the ordinary lactic-acid bacillus found in sour milk, therefore, it is capable of withstanding and thriving in a higher percentage of acid which it generates. The true *Bacillus bulgaricus* "A", under favorable conditions produces on an average four per cent of lac-

tic-acid. It is because of its ability to withstand acid, that it is capable of passing through the normal gastric digestion process unharmed. Ordinary lactic-acid bacilli are far less resistant to acid, hence, unless an animal ingesting them is suffering from marked gastric derangement characterized by marked acidity and fermentation, they will be destroyed by the normal Hcl of the gastric juice, and so cannot exert any action in the intestinal canal, which they do not reach alive.

The *Bacillus bulgaricus* will not grow at the ordinary room temperature as do the ordinary common lactic-acid bacilli, but it will grow at the body temperature. The organism does not grow well on the ordinary laboratory media, growing only very sparingly, a fact that unfortunately precludes the possibility of the average veterinarian preparing and maintaining pure cultures.

Lactic-acid therapy has lost favor with a host of physicians, partly because of exaggerated claims made for it, and partly because many of the commercial preparations claiming to be pure cultures of the Bulgarian bacillus have proved utterly worthless. Among the commercial preparations stated by the American Medical Association in its list of "New and Unofficial Remedies", to be practically pure cultures of the *Bacillus bulgaricus* are: 1. Hynson Westcott & Co., Bulgare Tablets; 2. Fairchild Bros. & Froster's Lactampoule; 3. Lederle Antitoxin Laboratories, Massolin. For any others see the pamphlet published by the association. Of the three mentioned, I have used Lederle's preparation, the Hynson Westcott Tablets, and also The Abbott galactenzyme tablets, with equal results.

Dr. J. Favil Biehn, of Chicago, writing upon the *Bacillus bulgaricus* as a therapeutic agent, says of it that it is his main reliance in gastro-enteritis in children. He says, "for five years tablets or galactenzyme bouillon has been my main reliance in the treatment of gastro-enteritis in infants. The children in the cases I have seen varied from three to four and a half years of age. Under ordinary circumstances, as these cases are seen by the average practitioner, the mortality should not be over four per cent when this treatment is employed; in fact, a number of observers have reported several hundred consecutive cases without a single death.

These children not only react to this bacillary treatment very rapidly, but in spite of from four to twenty bowel movements a day they generally continue to gain in weight. Originally, after

an initial purge—preferably of calomel followed by castor oil, or a laxative saline—I placed the sick baby on a starvation-diet for forty-eight hours with the *Bacillus bulgaricus*. Now, however, even in the highly toxic cases, in which the temperature is sub-normal, where the patients evidently have little or no reactive vitality remaining, I do not resort to the starvation-diet, but order a continuation of the breast feeding, or of the modified milk, or whatever the child may be receiving; provided the food being given is of the proper kind for the child.

If I prescribe the galactenzyme bouillon (Abbott) it is added directly to the feeding. I believe, however, that equally good results are obtainable from the galactenzyme tablets (Abbott) provided they are not too old, and have been kept in the ice-box, i.e., contain living, viable *Bacillus bulgaricus*. Indeed, it has seemed in some cases that better results followed the use of the tablets than of the bouillon culture."

In the writer's experience with the *Bacillus bulgaricus* in gastro-enteritis hemorrhagica of dogs, I find it best to start right off with the bacillary treatment, omitting any purge and allowing only a milk diet, provided the patient will take it voluntarily. In those cases in which the patient will not even take milk, and most of the cases one gets there is complete inappetence, I just administer from four to six tablets three times daily, and usually inside of thirty-six hours the patient will begin to lap all milk offered him. I also refrain from administering any agent tending to check the bowel movement, depending entirely upon the *Bacillus bulgaricus*, and I find that it seldom fails, and one can bring a dog around in pretty good shape by this method, beyond being very run down and poor in flesh. This can usually be easily rectified and in the course of a week or ten days, under a course of tonic treatment one usually begins to see the semblance of a normal canine again.

NECROTIC STOMATITIS. The treatment of this condition calls for a very careful nursing, and to my mind this is half the battle. Persistent washing of the mouth with the various antiseptic mouth washes, i.e., potass. permang. 1 per cent; glycothymoline; potass. chloratis; two percent solution of creolin painted on lesions with a brush, swabbing with tannic acid and glycerine, etc. The patient's bowels should be kept acting freely by occasional laxatives. Just as important as the persistent washing of the mouth is the persistent administration of nourishment. I administer eggs and milk,

concentrated beef broth, in small amounts every two or three hours with a syringe and this is a part of the treatment which under no consideration must be neglected.

After the signs of resolution are apparent, i. e., the dog showing desire to lap up fluids of his own accord, one must begin to build the patient up with appropriate tonic remedies.

SUMMARY.

I. It is the writer's wish that the vulgar term, or misnomer, black-tongue, should be dropped once and for all by the veterinary profession, as we have had enough of such, in our present day literature.

II. That in the *Bacillus bulgaricus* we have a very effectual therapeutic agent to combat the condition known as gastro-enteritis hemorrhag. canum.

III. There seems to have been a confusion in the past; two diseased conditions having been, as it were, fused into one, and termed black-tongue.

IV. There is no such condition, as black-tongue in the dog. The condition which has in the past been so diagnosed consists of two distinct and separate conditions, viz., gastro-enteritis hemorrhag. canum, and necrotic stomatitis of dogs.

N. B. In a recent bad case of necrotic stomatitis, the writer made an autogenetic vaccine, and derived great satisfaction from its use, and when occasion arises he will make further trials along these lines and will duly report through the medium of the JOURNAL.

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The nineteenth annual meeting of the Minnesota State Veterinary Medical Association was held at the Merchants Hotel, St. Paul, January 12, 13 and 14, under the presidency of Dr. E. S. Shore of Lake City. The clinic was held at Dr. C. E. Cotton's hospital.

ILLEGAL PRACTICE*

GEORGE J. GOUBEAUD, Flushing, L. I.

The illegal practice of veterinary medicine has reached a stage wherein, in my opinion it is becoming a positive menace, a source of grave danger to the health of the community through the ignorance of the person who attempts to apply a knowledge that he does not possess, thereby endangering the lives of the public through the transmission from animal to man of such diseases as: anthrax, rabies, glanders, tuberculosis, and many others. He does not know of their existence, much less of their presence when they do exist. He is usually the one person who can be thanked for the spread of foot-and-mouth disease, Texas fever and many of the other communicable and transmissible diseases of the animal kingdom, with the resultant loss of animals and their money value.

It is difficult for a lover of the veterinary profession to use temperate language in denouncing this class of common vulture. The quack, the nostrum vender, the patent medicine agent, the prescribing druggist, the dispensing wholesale and retail chemist, the vaccine manufacturer, the stableman doctor, the itinerant horse dentist, the correspondence school graduate, the graduate of the disreputable veterinary college, and the graduate of the reputable veterinary college, who was unable to pass the examination of the State Board of Regents and secure a state license, and the employer of the unlicensed man. And there is still another class of fakers who should not be tolerated, and I believe your attention should be called to them—they are the fake canine specialists, the dog doctor dealer, the adept in stealing and selling stolen dogs. Most all of this class pose as veterinarians. I have not mentioned them all—time forbids it.

This is indeed an appalling array for the prospective student to gaze upon and ask him to join our ranks. It is said that this is an age of competition, and if such be the case, I do not know of any business or profession that has so many illegal, unjust and unscrupulous competitors.

The lay public is led to believe that these men are regularly qualified veterinarians, and if the real danger lay alone in deception,

*Address of the President of the Veterinary Medical Association of New York City, January 5, 1916,

and the consequent fraud that is practiced. I do not think that much danger would result, but the loss inflicted is where the animal is unscientifically, inhumanely, and often times diabolically mistreated. The loss by death and of money value is not the only result, but where a contagious disease exists, it is not recognized until irreparable damage has been done.

The term "quack" has been applied to the illiterate, the charlatan, the humbug and the crook. He is shunned by those who know his qualifications. He is an usurper, in that he takes to himself a title that is not legally or justly his. For ages he has been derided, ridiculed, and the butt of the sarcastic humorist, and at times his brutal and cruel acts upon a poor dumb creature know no limit. He is usually devoid of principle, honor, reason or sentiment. His stock in trade consists of his ability to drink rum, repeat filthy stories, use foul language, steal prescriptions of qualified veterinarians, and scheme how to defraud and beat the law. His brazen indifference of law is amazing.

The native born is not the only offender. The foreigner, who has not as yet lost his sea-legs, swears allegiance to his adopted country with one hand and with the other he is arranging how to beat the law.

The nostrum vender and patent medicine man are an equal danger. Their frauds, willful and often malicious endanger life and property. They are persons who care not what damage is inflicted so long as they receive a profit from the sale of their concoctions.

Laws are being made and enforced that are gradually driving these fakers out of existence. There are millions in their concoctions and they are spending millions not only to avoid existing laws, but to prevent others from being placed upon the statute books.

The prescribing druggist, that semi-professional crook, that avaricious creature, that man who not only disposes of the forbidden drugs, but has been selling drugs that will not only kill the innocent, but the victim as well. He will renew your prescriptions when you forbid it. He delights in the profits derived by the sale of compounds, the knowledge of the ingredients he is stealing from some veterinarian. He will stock a stableman's medicine chest, and he affects to be offended when you question his right. He will dispense without qualm the most dangerous drugs and when called to

account, he will tell you that if he does not do it, someone else will. Some of the wholesale chemists and vaccine manufacturers are in the same class. They will sell to anyone who desires to buy irrespective of the consequences. The veterinarian who is employed by them or associated with them is no better. The veterinarian who from his college days to the day that he begins life as a full fledged professional man has been taught by precept and example, professional courtesy and honor. The code of ethics is being observed by the better element and the foremost leaders of the profession. As time advances he develops a fondness for the hidden mysteries in the bacteriological field; by study, by personal investigation and experimentation, he has discovered and developed through the aid of other veterinarians a serological form of treatment for certain contagious diseases and by the aid of his professional brothers he is enabled to place before the public a treatment that has some merit. No sooner has the treatment met with approval, than he proceeds forthwith to sell the remedy to anyone who has the price. He cares not whether his serum is injected into a glandered horse or a tuberculous cow. He forgets and does not care about the self-sacrifice of the men who taught him and the men who helped make possible the existence of his treatment. He commercializes the product. The result—he becomes careless in the preparation of his serum, foreign organisms gain entrance into this biologic product, and what follows is an outbreak of some contagious disease. The hypodermic syringe and the biologic material are responsible for more damage than we are aware of. You are doubtless aware of the outbreaks that have been caused by the introduction of some of these sera.

The unscrupulous manufacturers are the first to ask our aid, and having secured it, they are the first to become our enemies, and when the damage has been inflicted, they will again seek our assistance, only to repeat their contemptible acts at the first opportunity.

The stableman doctor—you all know him, and I am sorry to say we are in a measure responsible for his existence. The damage that he has inflicted, is in my opinion, equal to the damage caused by diseases. He usually does not possess the rudiments of a common school education, much less a scientific training. He is a most dangerous and expensive possession. My last experience was in a stable containing 23 horses, 21 of which were suffering from glanders

(12 of these were clinical cases). These men are most cunning and they will resort to any trick to hoodwink their employers as well as the veterinarian. We all know this. We all know that we will be sent for at the last moment and when the animal dies, the stableman will inform the owner that the doctor could not do any more than he did, and the owner believes him for he does not take time to investigate, nor do we take the trouble to notify the owner of the true conditions, and the stableman gets away with it at our expense. It is most amusing to listen to the statements of shrewd and able business men concerning the veterinary ability of their stablemen. It is surprising the amount of culpable ignorance they develop in this respect. Their favorite statement is that "My man has been around horses all his life—he knows all about them, and that is the reason I never need a doctor—he was raised with horses." One made this statement to me, and to prove its correctness, he brought me into his stable, which contained 50 horses. He asked me to look them over. I did. I picked out three cases of clinical glanders. One horse had setons in his shoulder, and his hoof upon the same leg was sloughing off, the result of a punctured wound. I also knew that he had three children and that they had diphtheria. When I was leaving the stable, I asked him how his children were and if the housekeeper was treating his family. Suffice it to say I was not employed to treat this man's horses, but another veterinarian was.

I feel that we must tolerate stablemen, but by no means encourage them. The itinerant horse dentist is another fake. He comes the nearest to being a clown and a sleight of hand performer than anything I know of. He is certainly a spell binder. He will operate upon a tooth of a horse that needs no operation. He will extract teeth that are sound and substitute a most odoriferously decayed molar with the expertness of a sleight of hand performer.

The correspondence school graduate is another class. He is usually a man seeking a short road to success, and the institution that encourages him is criminal. The poor deluded, misguided creature needs enlightenment and our sympathy, and I believe that the institution which humbugs this class of poor simpletons should be put out of existence.

The next in order in the class of fakers is the fake canine specialist, the dog doctor dealer, the adept in stealing and selling stolen dogs. Most of this class pose as veterinarians. Their stock in

trade consists in their ability to be guilty of dishonorable acts; to talk dog talk with the ability that would put a race track tout to shame. They are supplied with a hypodermic syringe, distemper vaccine and a case of tablets, guaranteed to cure any and every disease that a dog suffers from, and a pair of ear cutters.

The veterinarian is again responsible to a certain degree for the existence of this creature. He is responsible because he has in a certain measure taught him a few rudiments. He has advised him to employ some of the agents which are not found in the nostrum of the proprietary medicines.

This dog fake specialist usually employs a veterinarian to perform his operations. He pays the veterinarian for his services—he dresses the animal's wounds himself, charges the entire bill to the owner of the dog with the understanding that he is the one who has performed the operation; that he is qualified to perform operations and that he is a full fledged veterinarian. I am sorry to say that some of the veterinarians know this and they are perfectly satisfied to allow an usurper to take credit for the work which they perform and they do not care about the result or effect it will have upon the public as long as they are paid for the operation.

The graduate of the disreputable veterinary college is another class. The institution which grants him a diploma, is at best a fake and a humbug. It bears little semblance to decency and its faculty is no better. All that is desired is a candidate—the next the money. The school cares not to what depths it attempts to drag the profession. It has lost all feeling of self-respect and decency. It desires not to impart knowledge, it cares not to what humiliation its students and graduates are subjected. It is deaf to appeals and it will continue until an aroused public sentiment demands that it close its doors.

And the unlicensed graduate, who cannot and who in defiance of the law will not take the state examination is another class. He is equipped to a certain degree, but his requirements have not been completed, and at a time that he should show by his conduct that he is entitled to practice, is the time that he flunks. He will engage in practice in defiance of the law, or he will hire himself out as an assistant, which he usually does. He knows that he cannot legally report cases; he knows that he cannot hold positions under the civil service; he knows that he is unjustly competing with legalized, qualified men; he knows that he engages in an unfair compe-

tition; he knows that every act of his while performing professional duties is in violation of the law, and still he continues in his defiant and illegal course, and I am sorry to say that he is encouraged by some of the legalized, qualified practitioners, who employ him. Some of these encourage him in not taking the examination, and they know why; they ridicule the law to their illegal assistant—and they know why; and they know that the law protects them and not their assistants, and they know that they cannot afford, or will not pay, the salary to a competent, qualified assistant. Their practice will not afford it, or they are too miserably cheap to pay a decent sum, or they are afraid of a legalized, qualified man. They are fearful, lest after he has saved sufficient to start in practice for himself, that he may open an office and begin his professional career in opposition to his employer. They know that a successful practitioner must have a personality that is taking with the public as well as scientific ability, and they are afraid lest their assistants develop this to the detriment of the employer. They know these things and they still further know they are guilty of illegal, unjust and unfair, if not unscrupulous acts. They know the ability of the assistant and they also know of the illegal standing of that employee. They mock and ridicule the law all in the presence of of the assistant, and in their hearts they know why. Some of them will fly into a fit of rage and denounce anybody charged with the enforcement of the law, and they will threaten to go personally to Albany and have the law changed, and they also know why, and if the law could be changed, it would be for their own individual benefit. Some of these employers claim the law is unjust. They will state that their assistants do not engage in general practice, and again they know that this is not so. They know that no just or liberal practitioner objects to an assistant who accompanies his employer, dresses wounds, dispenses medicines, and does the nurse's work. There is no valid objection to an illegal assistant performing nurses work and the employer is aware of this. We are all aware of it, and I do not know that we as a body object, but what is objected to is that an employer sends out his non-registered assistant to engage in general practice in competition with a registered man. He knows that he does not employ the assistant as a nurse, but to engage in general practice. Some of the assistants develop expertness in a few instances, and their employer is very deficient in these individual cases. He uses the assistant to perform these operations

and the money derived more than pays the salary. A case in view will illustrate the point I wish to make. I know of a veterinarian who employed an unlicensed assistant. This assistant had little ability, but he possessed a knack in handling a vicious dog. By continuous application he became an expert in ovariectomy in cats and dogs.

The employer had a mortal fear of a dog. He would put a cat to shame climbing a telegraph pole in his efforts to escape the harmless toothless pup. He knew that his assistant had absolutely no fear of the dog and he knew that his clients rather favored his assistant. He did not care. His assistant made the money out of canine practice, which more than paid his salary. He also had the assistant do other work, such as night calls, urgent calls, clerking, bookkeeping, janitor and driver service. He knew that he would not have any canine or feline practice if it were not for his assistant, and he also knew that when his assistant left him he would lose his dog and cat practice. He was everlastingly ridiculing the law, as well as defying it. He continually urged his assistant not to take the state examination. He knew why he did these things—the result was that the assistant became discouraged at his position, circumstances arose that compelled him to take the state examination—the result—he has left his employer and has built up a nice paying practice; his employer has no assistant and has no canine practice to speak of, and is still engaged in general practice. This is not an exception. I can cite any number, and so can you.

The practitioner who employs a non-registered or an illegal assistant shows an utter contempt and disregard for the hardships and the ambitions of the young practitioner. He forgets the time when he did not have the price of a week's board and did not know where to get it. He does not remember the time when he was notified that his rent was past due. He does not remember the time when he was to receive a dispossess notice. His only possession was a scientific training, a hustling ability and taking personality.

Illegal practitioners met him everywhere, the leading members of the profession saw that this ambitious, worthy young man was being handicapped by his illegal and unscientific competitors. They framed and had passed laws that protected him. Expenses were incurred in having a law passed, and his only subscription was the "widow's mite". The framers of the law asked nothing

from him, but that he be straight. The law was passed and he grew fat under its protection. His legal standing gained him a position that he could defend, and by attending to his practice, and he stuck close to it, as did the proverbial leech. He sought the friendship and acquaintance of men whom he thought would be of assistance to him. He denied himself the pleasures and recreation of life, lest by his absence he lose a call. Instructions were given by him to his friends where to find him in case his services were required and wherever he was needed, he could be communicated with immediately. He was never known to lose a call, and he never lost an opportunity to secure a prospective client, and as time advanced he built up a practice that demanded help, and he forthwith proceeded to employ an illegal practitioner. He has lost his memory, his high ideals have been cast to the winds. He forgets the laws that were passed for his benefit. He denounced injustice once, but he cares not about justice now. He bemoaned his position once, but he is on easy street now. He mocks and ridicules the law that gave him a standing; he cares not for the suffering, hardship, injustice and humiliation he inflicts upon others. He is deaf and blind, but not dumb. Just accuse him of these acts; just call these facts to his attention, and he will denounce you most vigorously. His audacity is amazing and his reasons are as illogical as are his illegal acts.

The employer of a non-registered man defies the law and he knows it, and he also knows that an accomplice in the commission of an offense is equally guilty, and he knows that he is guilty, and he will continue in his way of law breaking, but let someone injure him in the same manner as he has injured others. How quickly he will invoke the law that he continually breaks.

Now gentlemen, to sum up—these conditions exist and they will continue to exist until some drastic action is taken and the law enforced, and when it is enforced, which I hope will be soon, let us see to it that there are no repetitions. We have it in our power to enforce the law and let us all pull together and do so.

The Western Pennsylvania Veterinary Club, with Dr. Fred Weitzel of Pittsburgh as secretary, has been organized to supersede the Western Pennsylvania Veterinary Medical Association.

VETERINARY PREPAREDNESS

R. VANS AGNEW, Veterinarian 5th Cavalry,
Fort Leavenworth, Kansas.

As almost every stratum in society in our country is taking up the question of preparedness in a serious frame of mind, either for or against that state; it is time that the 14,000 veterinary surgeons of the United States should look at the question as it particularly affects them, and still more especially must the A. V. M. Association, for it is the organized part of the whole body. Therefore it can prepare to a useful degree from the very start of war if that unfortunately happened.

No veterinarian can look back with pride on the organization of the veterinary department during the insignificant Spanish and Philippine wars: but with that failure to spur us on, we must not be found wanting in the next war.

It is a question of organization: to get which we must first know what we will require: the next thing is to acquire it: lastly, if we are called upon, to perform each his part with his utmost ability.

There is no better proof of a good organization than in the fact that it is elastic and in sudden emergencies can be promptly and rapidly enlarged to meet them, consequently, with our small army we must develop our schemes of preparedness very thoroughly with a view to a sudden and enormous expansion that will have to be met with order and efficiency.

It is my intention to give to the A. V. M. Association a general idea of what would be required of us in war times. To begin, our army at present has only 15 regiments of cavalry and six of field artillery. There are two veterinarians to each regiment, making 42 in all. This is in our supposed army of 100,000 men.

Superficial reading of newspapers on the war in Europe gives one the impression that cavalry is no longer an effective arm of the service and therefore will not be used, and that motor power has driven the horse and mule out of the war game as a draft animal. To offset that we read that about 300,000 horses and mules have been bought in this country during the last 18 months and are still being bought by European nations to use for war purposes, also in "The Field" an English paper, on "Horses in the War" that "since the beginning of the war more than 100,000 horses have

passed through the hospitals.' This is on the British side alone.

If we take the French, German, Austrian and Russian figures at an approximate *pro rata* number of horses used by each nation, we can safely say that nearly a million will have been wounded or killed in this war.

The only section in the battle line in Europe where cavalry is not being extensively used is on the western side in France and Belgium, owing to the smallness of the country. On the eastern front cavalry is freely used and in our vast country this would also happen for we would be able to manoeuvre as much cavalry as we wished. Anyhow we can make up our minds that huge numbers of horses would be used by us in our next war.

One thing this present war has brought out is the need of enormous quantities of guns that are mobile in character and can be shifted about quickly and easily, so we can look for a very large increase in field artillery to offset the contemplated decrease in cavalry, which means that the same, if not a greater number of horses will be needed. Our present army has 21 regiments using 42 veterinarians, supposing it was suddenly increased to 150 regiments requiring 300 veterinarians for the regiments alone and probably 400 more for our first army purposes, and these 700 men wanted inside of a week. That would be the situation to say nothing of the equipment and medicines to be collected at the same time.

As the ruling body of our profession in America, it is surely up to the A. V. M. A. to take this matter up seriously and draft a well organized and elastic scheme whereby it can put proper and competent men into any and all positions that the government may call on the veterinary profession to fill in time of war.

At present the quartermaster department is in charge of the remount system; the buying and issuing of all veterinary supplies and the employing of civilian veterinarians in time of war; this it is needless to say is not in agreement with the ideas of the army veterinarians or of any medically taught man who has to receive lay orders on his own profession. Consequently our army veterinary organization is poor and in time of war it proved so top-heavy as to be very expensive and fairly worthless. It will continue so until the authorities learn that the indispensable condition of efficiency in peace or war is *responsibility*.

However, it is the present system and we must make the best of it and aid it as much as possible.

Our remount system was very small before the civil war and was handled by the quartermaster's department which continued to do so for the first two years of hostilities. But the service proved so unsatisfactory that on July 28th, 1863, General Stoneman was made chief of a cavalry bureau to take charge of it, and depots were established at St. Louis, Mo.; Nashville, Tenn.; Harrisburg, Penn.; Wilmington, Del.; and Giesborough, Md.

Details of the depot at Giesborough are most instructive. It comprised 625 acres; five thousand men were employed in its construction and after completion there were 1500 regular employees. It was started in August, 1863. Within three months the capacity of the plant was 15,000 head and by February, 1864 was increased to 30,000 head; though the greatest number of animals kept there never exceeded 21,000 head.

The veterinary hospital had a capacity of 2,650, the stables 6,000 and the sheds 10,000. The yards and corrals covered 45 acres. The total estimated cost of the whole depot was \$1,225,000.00. One can gain some idea of the extent of the work done at the depot.

On hand January 1, 1864.....	15,721
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Received by purchase Jan. 1, 1864 to June	
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30, 1866.....	5,326
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Received from other depots for issue.....	59,507
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Received for recuperation.....	85,980
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Received by transfer from artillery.....	4,120
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Total.....	170,654
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Issued to troops in the field.....	96,006
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Issued to officers after June 30, 1865.....	1,574
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Issued for sale or sold at department.....	48,721
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Died	24,321
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On hand June 30, 1866.....	32
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Total.....	170,654
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In this report the enormous number of deaths strikes one very forcibly but can be partially accounted for by a lack of knowledge and sanitation in those days. This depot handled in all about 210,000 animals, the greater part of which were sent to the troops of the army of the Potomac.

This one depot will give us some idea of the vast number of

animals needed by an army of approximately one million men in those days, and the same number and even more will be needed in the present or future wars. The cavalry bureau was finally merged into the Q. M. department about January 1, 1865.

In 1908 the Q. M. General started the present system of remount depots. The first one at Ft. Reno, Okla., comprising 10,000 acres with necessary buildings and feeding capacity for 2,000 to 3,000 head. The second one at Fort Keogh, Mont., comprising 100,000 acres and necessary buildings and with feeding capacity for 4,000 head. The third one at Fort Royal, Va., comprising 5,000 acres with the necessary buildings and feeding capacity for 1,200 to 2,500 head.

In time of war these depots could be capable of very large expansion, but their usefulness would depend largely upon the power or powers we would be fighting against and the situation of the battle fronts. Anyhow we would require at least two other depots and possibly three with a capacity of 25,000 animals in each of the six places.

These animals will have to be received, inspected, isolated, treated, properly fed and watered, and shipped out sound and fit for service, calling for large veterinary hospitals, stables, isolation hospitals, sanitary surroundings, proper feed and good water, all of which will have to be overseen by veterinarians and many of them. These depots are just the receiving stations and do not come in contact with the armies in the field.

In the field the veterinary service could be arranged so as to be mobile in character at the extreme front, gradually getting more stationary on the lines of communication towards the military base.

To every division of infantry (about 7,500 animals) and every brigade of cavalry (about 3,000 animals) is attached one veterinarian and 25 well trained horsemen. These men should have had some training in farriery work such as they would get around veterinary hospitals in civil life and also discharged farriers from the army. They should be all mounted and equipped with necessary veterinary supplies in order to come up behind when an army is on the move or after a fight, to collect the wounded animals, examine and first aid them and arrange for their transfer to the rear to the field hospitals, thus relieving the regimental aid stations of severe cases and inefficient animals. Roughly speaking it would

require 500 veterinarians and 3,000 veterinary men to carry out this scheme in an army of 500,000 troops.

To give some idea of the value of an efficient veterinary corps, these figures are taken from "The Field," an English paper, and are from the report of the Secretary of the R. S. P. C. A., on some results of the English Army Veterinary Corps: "The total number of animals treated in hospitals to last August was 81,134. Of these 47,192 were returned to remounts as cured, 4,266 died, 4,843 were destroyed and 1,842 were cast and sold. Beyond these 22,991 remained in the hospitals and at the convalescent horse depot."

Practically more than 100,000 horses were treated in the hospitals during 11 months of a war in which cavalry was only used as a fighting arm for a few months and motor transportation is supposed to have superseded the draft animal, and this in an army of about 200,000. No wonder that we have to take this matter up seriously when we think of the hundreds of thousands of dollars we can save the country by effective arrangements, and also save wounded and sick horses besides increasing the striking power of our armies.

If the government knew where it could immediately employ 1,000 good veterinary surgeons who have studied over, and for these conditions and in many cases have done enough field work to gain some idea of what would be required in the army, it would probably turn our work over to us and give us a chance to prove our responsibility in the matter.

At the start of a war veterinarians will be wanted for meat inspection; hay and grain inspection; buying and inoculating horses; buying veterinary medicines and supplies; remount stations; convalescent depots; inspection of horse-shoeing and army field work. All these subjects except the army field work are to a great extent well known to the members of the A. V. M. A., but each man can perfect himself a little more in them if he intends to join his country's army in time of war and many can do the field work if they wish. There are national guard troops of cavalry and artillery, and there are U. S. troops of cavalry and artillery scattered over the United States and I am sure that veterinarians could arrange to join these troops on their practice marches each year. Any army veterinarian would gladly help. For instance, here at Fort Leavenworth, Kansas, there are four troops of cavalry. In 1915

each troop made a practice march of three days and the squadron (or whole four troops) made three marches, making seven marches in all, and they will no doubt have these this summer of 1916.

I am very positive that arrangements can be made to take one veterinarian along with each troop and four veterinarians when the squadron marches; this would accommodate 16 veterinarians and the same could be done elsewhere. Speaking personally I would say that if any veterinarian wishes to take advantage of this offer I will be only too glad to arrange it for him and can guarantee that he will be given a good time in every way by the officers of the second squadron of the fifth cavalry.

In this manner a great many veterinary surgeons will understand field conditions, etc. in the army, and these are the most useful to know in war time, also they will learn that riding a horse is an indispensable accomplishment and that resourcefulness under adverse conditions is the true test of a man's knowledge; laboratory knowledge solely is not enough. This article is merely tentative, it is for the purpose of bringing before you a general idea of what should be done and what is needed to do it. But there is no doubt that it should go further than the experimental stage and that a committee of members of the A. V. M. A. should be formed in order that the association may eventually be able to afford the war department precise knowledge of the number of veterinarians who can immediately take up the different specialized lines of work that each one is most competent to perform when summoned.

Definite collaboration and aid from the S. P. C. A. will have to be arranged. In the meantime it is earnestly requested that members will give this subject consideration and collect concrete ideas about it so that by August 22nd in Detroit we shall have something definite to work on.

An acceptance by the government of our plan of service will increase our professional status and raise our moral status, in that every man would feel a personal pride in being really useful to his country in her need.

The Idaho Association of Veterinary Graduates will hold their next regular annual meeting at Blackfoot, Idaho on February 3 and 4. A good program and banquet are planned, also a good clinic at Drs. White and Williams' new veterinary infirmary.

MUNICIPAL MEAT INSPECTION*

A. E. MERRY, Syracuse, N. Y.

At the different meetings of this society there have been papers read upon the subject of meat inspection, and discussions following which have played a very important part in arousing public interest in securing in this city a meat inspection ordinance which was passed by the common council in July, 1913. Briefly, however, I will attempt to give you the more important working points of the ordinance, and a few of the results which have attended our use of it.

The first requirement of the ordinance is the appointment of a veterinarian and two assistants whose duty it would be to enforce it.

All meat which is brought into Syracuse must be presented for inspection and be stamped except that which has been inspected and stamped by the Bureau of Animal Industry, state or municipality which maintains a system of post-mortem inspection and marking equal to the standard maintained by the city of Syracuse.

The ordinance also calls for a license in each slaughter house and market within the city limits, and this license is not to be granted until such slaughter house or market conforms to the requirements of this ordinance. It also restricts the hours of killing or slaughtering of animals within the city limits. It provides for the construction, sanitary conditions and equipment of such places and the health of the people or persons employed therein.

This ordinance was to have been put into operation January 1, 1914, but due to the objection and strenuous opposition on the part of butchers and meat men, who were desirous of rescinding it, matters were delayed for a considerable length of time. However, provision was made in the budget for 1914 for the appointment of the required number of inspectors, and a number of meetings of the health committee of the common council were held to give the butchers and meat men an opportunity to offer their objections to the ordinance. After considerable time had been spent, it was found that their chief objection was to the term "license" being used and that they would be perfectly willing to submit to the term "permit" instead. This point was granted, inspectors

*Presented at the meeting of the Central New York Veterinary Medical Association, November, 1915, Syracuse, N. Y.

were appointed and began work April 1, 1914; a motorcycle being provided as a conveyance to be used in reaching country slaughter houses, and a system of stamps and report blanks was worked out and provided.

As we had no stamping station, we tried the system of inspecting the meats after they had been delivered to the markets and before they were offered for sale in the markets. During the remaining nine months of the year there were 7,589 carcasses inspected at slaughter houses, and 12,471 carcasses inspected in the markets and on the streets; or a total of 20,060 carcasses, out of which 15,000 pounds of meat were condemned.

Shortly after January 1, 1915, it was decided to use as stamping stations our two public markets, one located on the north side and one on the south side, and since then the butchers and farmers have been required to drive to either of these places where inspectors have been stationed during the hot weather from 7 until 10 A. M., and in cooler weather from 8 until 11 A. M.

During the first nine months of this year 7,529 carcasses have been inspected in the slaughter houses and 17,394 carcasses inspected at these stations; a total of 24,923, out of which 34,054 pounds of meat have been condemned. So that in eighteen months of inspection nearly 25 tons of meat have been condemned and confiscated.

From time to time violations have been discovered and in a few cases arrests have been made where we had proof and evidence sufficient to obtain a conviction. On one occasion the pleura was stripped or peeled, removing the tuberculous lesions from the ribs of an infected animal and when the carcass was detected in the market the butcher who had placed it there pleaded guilty and a fine of \$25.00 was imposed by the court.

On another occasion a man was arrested upon the warrant of an inspector for having bob veal in his possession within the city limits. But in this case the jury disagreed.

Another case where a man was found delivering bob veal to a meat market, upon being arrested pleaded guilty and was fined \$50.00.

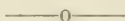
This perhaps has had its effect upon certain persons engaged in the business, and now in a majority of cases when a butcher finds that he has a generalized case of tuberculosis, he either buries the same or carries it to one of the rendering tanks. We are bothered very little with immature veal.

On the whole we feel that the butchers have co-operated remarkably well and in the majority of cases they seem as anxious as the city to have their meats and sanitary conditions right.

At the present time we are lending our efforts to obtaining a suitable stamping station and a year from now we hope to be able to offer for your inspection a fully equipped stamping station.

An inspector goes to the meat markets every afternoon to look over the condition of the meats on hand, to see that they are stamped and also take in the sanitary conditions of the markets. The markets in the outlying sections of the city have been painted and the interior of the coolers in all sections of the city have been shellaced and a large percentage of them white enameled. We found that shellac could be used during the warm weather when the meat was in the cooler, one side of the cooler being shellaced while the meat hung on the other side, and that shellac made a very good sub-coat for the white enamel.

I want to take this opportunity to extend to all of you an invitation to visit us at any time and look over our system and offer any suggestions which you may have and which may be of advantage to us.



LIVE STOCK AND VETERINARY CONDITIONS IN GEORGIA*

DR. E. M. NIGHBERT

Of the United States Bureau of Animal Industry.

Inspector in charge of eradicating Cattle Ticks in the States of Georgia and Florida. Atlanta, Ga.

In my invitation to attend this meeting it was stated that I might present the subject of eradicating cattle ticks or any other subject I desired; therefore, in addition to that subject I wish to present in a brief way some of the things I think important to the veterinary profession, especially in this state. It was noted that your program carried among scientific subjects the lay subject, "Veterinary Practice by Farm Demonstration Agents"; this will be touched upon later in this paper.

*Address before the Georgia State Veterinary Association, Macon, Georgia, October 26, 1915.

Eradicating the cattle ticks in Georgia is the first step in clearing the way for a profitable cattle industry. It is a co-operative work; therefore we are co-operating with your state veterinarian, upon whom rests the responsibility of carrying on this work for the state. The efforts of one man are insufficient in this movement, however, so county officials, farmers and business men are required also to co-operate along certain systematic lines. The work began in 1906, and has made satisfactory headway, resulting in freeing nearly one-third of the state from this serious menace to the cattle industry. Completion of the work will be of much value to the farming and business interests. Improved sires and herds are being introduced in the area freed of infection for the purpose of improving the native cattle. The cotton farmer being a beginner along this line of maintaining improved cattle and other live stock on the farm, necessarily will seek advice and suggestions for his guidance and protection. Naturally the veterinarian will be expected to render valuable services.

In 1899 the state enacted its first law for the protection of live stock against the spread of disease. It applied only to the diseases of cattle, especially to the spread of the cattle fever tick. This law attracted but little attention and interest until 1906, when the general campaign of tick eradication was inaugurated. Since the establishment of this act general improvement in the way of more adequate laws for the protection and fostering of a great live stock industry, to which the state is especially suited, has been made effective. Recently, additional acts with regard to dairies, slaughtering, abattoirs, meat inspection, markets, and pure food have become effective, including an act to regulate the practice of veterinary medicine and surgery in the state. Naturally the veterinarian is interested and will assume a prominent part in carrying out certain phases of these laws, which are for the protection of public health and live stock against the spread of disease. Therefore, the profession today bears a greater responsibility and relationship to modern progress along economic agricultural lines, public health, and live stock sanitation than ever before. The responsibilities of the profession are greater year by year, requiring higher education, experience, and practical knowledge of present-day conditions.

The live stock of this country is worth today nearly six billion dollars. Notwithstanding all the motor-driven vehicles, there are more horses and mules on our farms today than there ever were.

Cattle are increasing in numbers and value; this condition also applies to hogs. With the country growing older and no new continents to be discovered and converted into farms, and the population increasing, we must make the best of what is here before us. Therefore, diligent study of the great live stock industry in health and disease must continue, that the industry may be fostered, encouraged, and protected.

THE VETERINARY PRACTITIONER. I believe and know that the veterinary profession is equal to the demands to which it is subjected. In my experience of several years actively engaged as a veterinarian I find the profession as a whole equally qualified and as reputable as any other body of scientific men in this country. Their opportunities are varied and difficult of accomplishment, but they have been taken advantage of in a scientific and professional way that has been of great service to the public. It must be kept in mind that all professions have their full share of men of questionable motives. To illustrate, please allow me to make a brief comparison: note what has been revealed since the recent federal narcotic law has been in effect with reference to the unscrupulous physician: note what has recently been revealed within the borders of this state concerning the unscrupulous lawyer, all of which are well known to you. I am not venturing a criticism; these instances are merely mentioned to indicate the importance of keeping such conditions in the veterinary profession reduced to the minimum, which may be accomplished through your organization. No profession should be judged or criticised as a result of the action of a few. I have seen your membership increased from a few to your present body of over fifty men. To-day you are recognized as an important agency in the state and are in a position to aid in the systematic plan to develop a live stock industry. You realize, I am sure, the importance of live stock in connection with cotton farming.

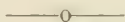
The State Agricultural College, established during the past seven years, is the main factor in fitting men for proper live stock breeding required in connection with modern methods of carrying on farming operations to suit present-day conditions. The veterinarian is likely to overlook the importance of a practical knowledge of the soil and crops of his territory, when, in fact, he should acquaint himself with all the things that affect the farming interests in order that he may be able to discuss them accurately. There-

fore, I believe the veterinarian should make it a point to attend the farmers' meetings and become acquainted with all the local live stock conditions. He should continue his study of feeds and feeding, live stock breeding, and marketing, and make it a point to attend the Farmers' Short Course at the college. By so doing he will soon become a factor in modern things agriculturally in his community.

VETERINARY PRACTICE BY FARM DEMONSTRATION AGENTS. This is a day of organization and concentrated action in order to get things done; therefore, I wish to say in connection with the subject of "Veterinary practice by Farm Demonstration Agents," that the farm demonstrator is a representative of the United States Department of Agriculture, or of the State College of Agriculture, or some other agricultural agency interested in the development of farm resources. In fact, he may be considered an envoy sent to negotiate with farmers with the view of doing certain things. He may not be a scientific expert or trained professionally along the many lines of his work. In reality I believe he is intended to be more than that, because he is supposed to possess all the qualities of a practical man with a working knowledge of the needs of his territory and the ability to introduce and demonstrate practical and permanent farming methods. In addition, he is in a position to put his clientele in touch with the proper divisions of state and federal agencies, when subjects not thoroughly understood confront him. I believe you will find the farm demonstrator a good man to become acquainted with. I believe you should cultivate his interest and co-operation, although perhaps it is possible that he, as well as other laymen, may at times assume responsibilities along the line of veterinary practice which are greater than his knowledge or qualifications would permit.

In conclusion, the great struggle of mankind has been to reach the point of understanding diseases and other natural conditions that hindered his legitimate progress. State governments and education have given the people this opportunity. The great propaganda of education has in a large measure pushed aside ignorance, superstition, and prejudice. Education is always followed by scientific advancement, and man is decidedly the beneficiary. The present methods of dealing with the ailments and infectious diseases of live stock are the best human skill and mind have to offer, nevertheless new conditions will continually confront us, and

we shall always have use for all the knowledge that can possibly be obtained along the lines of our work. The veterinarian should keep in touch and co-operate with all state and government agricultural agencies; study everything modern possible along his line of work; be broad and liberal as a man and professionally; and make this association a live one and a greater factor in fostering and encouraging public enlightenment and better scientific knowledge among its members. So will the veterinary profession continue to advance and remain in the ranks as one of the leading professions now serving the people.



REPORTS OF CASES

INTESTINAL OBSTRUCTION BY A STONE IN A DOG

ROBERT W. ELLIS, New York, N. Y.

The value of high enemas in stoppage of the bowel is pretty generally appreciated by veterinarians in both large and small animals—as well as by physicians in human patients. The writer, like many others, can recall many instances where it has been the only means of relief, and submits the following case as an example of what is frequently met in canine patients, and as an exemplification of the value of this mechanical form of treatment in contradistinction to the futility of the administration of medicinal agents per orem in such conditions. A dachshund (female) two and one-half years old, was brought to the office for treatment, with a history of not having eaten anything for eight days, and having been vomiting persistently, especially after drinking, during that period of time. There was some uncertainty about the bowel movements, but the owner “did not think there had been a movement for a few days.”

A diagnosis of stoppage of the bowels was made, a high enema given, also a cathartic administered: although there was very little hope of the patient retaining it.

Vomiting soon occurred, at which time, in addition to the medicine administered, a foul-smelling material, closely resembling soft fecal matter, was brought up.

Mechanical obstruction was suspected as the cause of the stoppage and the suspicion fully explained to the owner who after a careful mind-searching, recalled the fact that the dog had swallowed a stone nine days previously; the day before the loss of appetite and vomiting had been noticed.

Instructions were then given the owner to persist with the high enemas, as it was the only form of treatment from which relief could be hoped; it being explained that medicinal agents of any kind would not remain in the stomach so long as the passage beyond that organ was blocked.

The dog was very weak from eight days' fasting, to say nothing of the exhausting effect of the vomiting, and the owner was pretty low spirited; but accepted the situation and faithfully continued the high enemas of hot soap-water, to which a small quantity of glycerine was added, twice daily, which finally resulted on the third day, in the passage of an irregularly shaped stone, measuring three inches in circumference and weighing half an ounce.

The equipment for the high enemas consisted of a rubber tube seventeen inches long and one-fourth inch in diameter, regular catheter tip one end. The opposite, or open end, was slipped over the rectal tip attached to an ordinary fountain syringe. The tube well soaped, was passed in a little way before the flow was started, then gradually advanced until sixteen inches of its length had entered the intestinal tract. Each flooding brought out something, but no relief was obtained until the stone came down, when immediate improvement in the dog's spirits and condition generally, was noticed, with a cessation of the vomiting, and the following day the appetite returned.

To summarize, the dog swallowed the stone on the 9th day of the month, stopped eating on the 10th, began vomiting on the 11th, was brought in for treatment on the 18th, (nine days after swallowing the stone), passed the stone on the 21st, (after three days treatment) and began eating on the 22nd.

The stone remained in the dog's alimentary tract twelve days and she fasted that length of time.

RUPTURE OF THE DIAPHRAGM WITH RECOVERY

WALTER M. PENDERGAST, Syracuse, N. Y.

On August 2 at 8 P. M. was called to see a large black horse which the owner said had colic. Found the animal down in the stall, sweating profusely.

HISTORY. This horse had worked in a team on a sewer excavation all day. He ate his feed at 6 P. M. and was found down in his stall at 8 P. M.

SYMPTOMS. Patient seemed to be in considerable pain. He would lie down and stretch out on his side and occasionally would sit on his haunches. Respirations were about thirty and were short and labored; pulse 60. Peristalsis was quite active with no sign of bloat. Rectal exploration did not disclose much except that the intestines seemed to be farther forward.

Gave him one grain arecolin and one ounce chloral hydrate. obtained good action from the arecolin and the chloral seemed to quiet him to a certain extent. Repeated this treatment in two hours. Patient showed more or less pain all night. On the following morning the animal was still in some pain but not so acute. The respirations were very short and labored, temperature 103°. Up until this time I was at a loss to know what the trouble was, but the manner of his breathing led me to suspect a rupture of the diaphragm. On auscultation a distinct rumble of the intestines could be made out extending almost to the point of the elbow on the right side. I informed the owner that I suspected a ruptured diaphragm and that the animal would probably die. I had given him ½ oz. aloin on my first visit and on August 1st the patient was purging freely. On August 2nd the patient was free from pain and began to eat a little. He still had that short labored breathing and there was a slight edema between the front legs. The patient continued to improve until August 7th when I discontinued my visits. The patient was given absolute rest for six weeks and was gradually put to work again. He had a slight attack of colic about October 1st but not enough to warrant calling a doctor.

PARTURIENT FEVER?

THOMAS A. ALLEN, Brockville, Canada.

On November 12th I was called to see a Holstein heifer, aged two years and reported to have been five months with calf.

The symptoms presented indicated acute indigestion and possibly caused by an over-feed of meal or ensilage. I applied the usual treatment in such cases with good results.

By the 19th all untoward symptoms had entirely disappeared. On the morning of the 20th, 7 A. M., no unfavorable symptoms were apparent to the attendant, but when he returned to give the noon feed he was greatly surprised to find his patient completely prostrated and in his opinion in a dying condition. I arrived about 12:30 P. M., and found the patient lying on the left side, head and limbs stretched out, head twisted over and partly resting on the opposite side; mouth open; tongue protruding; eyes glassy and entirely without sensation; temperature sub-normal; pulse indistinct; no motion in limbs or head, and when rolled up on the sternum the head flopped over on the right side; in doing so exhibiting that peculiar kink in the neck.

I first gave a hypodermic injection of strychnine, then tried to administer a stimulant but found it impossible as it caused symptoms of strangulation. By this time I was satisfied that I had a well marked, typical case of parturient fever, and at once gave the milk fever air treatment.

I left my patient well propped up and in good hands. I returned at 5:30 P. M. and found a decided improvement and lying on the right side; the attendant informed me that she turned over without assistance; lying on the sternum; head held up at times; ears moving as though warding off flies and the eyes becoming sensitive to touch.

I repeated the strychnine and reinflated the udder, then left for my office.

On my return the next morning, 9 A. M., I found to all appearances a perfectly healthy cow and anxiously looking for her morning feed. No further treatment was prescribed more than careful dieting for a few days. The attendant informed me that the heifer got to her feet about 7 A. M., but I feel certain that was not the first time.

Now, the question is, was it or was it not, parturient fever?

WHAT WAS THIS TROUBLE?

WALTER M. PENDERGAST, Syracuse, N. Y.

HISTORY. On September 20th I was called to see a Holstein herd in which several animals were affected. The owner stated that the affected cow came in from the pasture at night, appearing dull and showing lack of appetite. From September 20th to 30th we had twenty cases in this herd. On September 27th another herd about six miles distant showed seven animals affected, with symptoms almost identical with those of the first herd. All of the animals affected were cows in milk with the exception of three young heifer calves about six months old.

SYMPTOMS. In the early stages the animals showed lack of appetite, high temperature 104° to 106°, pulse and respiration somewhat increased, milk secretion greatly decreased and what little could be drawn was thin and watery and contained clots of flocculent matter. The milk also showed minute blood clots which gave it a distinct pinkish cast in most of the cases. All four quarters of udder were affected, but did not show any swelling or tenderness. There was slight constipation with the feces a very dark color, almost black. In two or three days there was generally marked improvement with fall of temperature and return of appetite. After one or two weeks the animals seemed to return to a normal condition except some loss in condition.

TREATMENT. The first cases were given 1½ pounds of epsom salts, but some of the latter cases which did not get the salt seemed to do about as well. A fever mixture was given every three hours until temperature returned to near normal. Potassium nitrate ½ ounce and sodium bicarbonate 1 ounce were given twice a day for four days followed by sulphate of iron in 4 dram doses twice a day.

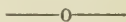
All of these cases appeared in cattle that were kept out at pasture; those stabled in the barn were not affected. On these two farms the pastures are on low, flat, clay soil, some of which had been overflowed a short time before the attack. It appeared to me that this trouble might be due to a fungous growth on the vegetation due to the excessive amount of rain which we have had the past summer.

ABSTRACTS FROM RECENT LITERATURE

CEREBRAL SOFTENING. Veterinary Major Floriot. *Rec. de Med. Vet.* An eight year old gelding was found one morning lying in his stall and unable to get up. He had a few skin scratches on the orbital arches and a slight discharge. He moved his legs and the skin all over his body remained insensible to the pricks of a pin. His temperature was 37.1°C . Respirations a little accelerated. He had never shown any brain symptoms. Frictions of oil of turpentine were prescribed and 20 c.c. of ether injected subcutaneously. He then got up for a few minutes and then dropped. Coffee and alcohol were given. He got up again and remained standing for three-quarters of an hour. He laid down after this and died a few hours later.

POST -MORTEM. Body in good condition. Blood normal. Thoracic and abdominal organs normal also. In the cranium, there was no fracture, the meninges appeared normal. In the brain the right lobe was the center of softening and in the ventricle two fibrinous clots were found. Cephalo-rachidian fluid was very abundant. The spinal cord was normal.

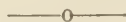
A. L.



MODIFICATIONS OF BACTERIA IN THE ANIMAL BODY, XI. STUDIES ON NON-CAPSULATED ANTHRAX. (VERÄNDERUNGEN VON BAKTERIEN IM TIERKÖRPER, XI. UNTERSUCHUNGEN ÜBER KAPSELLOSEN MILZBRAND). Dr. Oscar Bail; University of Prague. *Centralblatt für Bakteriologie, Parasitenkunde und Infektionskrankheiten: Originale*, Vol. 76, pp. 38-46, 1915.—In a previous communication the author described (this *Centralblatt* Vol. 75, Orig., No. 2) a strain of anthrax bacillus obtained by heating a normal culture to 48° to 49° . This was now used to study the relation between capsule formation, spore formation and pathogenicity. It was found that there was no apparent relation between capsule and spore forming power, but between capsule forming power and virulence there was a close connection. The new strain was entirely similar in its characters to the regular form of anthrax bacillus, being different of course, in having no capsule and a much diminished virulence. An examination of over 100 cultures in fluid serum and of 3000 colonies taken off agar plates showed only capsule free forms. Neither

the capsule forming power nor lost virulence were restored on passing this bacillus through several susceptible animals. Edema is produced when the culture is injected subcutaneously, in mice and rabbits.

BERG.



HOG CHOLERA SERUM. "Lab. Bul. No. 2, 10-23-15. Experiment No. 82 Hog Cholera Serum, begun 6-16-13 by E. W. Mumma and John Reichel." *Mulford Veterinary Bulletin No. 2, Vol. 7, January, 1916.*—"Problem: To determine the value of carbolic acid and trikresol in the preservation of hog cholera serum, defibrinated blood.

Carbolic acid is generally used as the preservative of hog cholera serum, even though comparatively little is known of its value as a germicide in such a product as hog cholera serum in the form of defibrinated blood as originally prepared by Dorset, McBryde and Niles. That carbolic acid itself has little or no effect on the potency of the product is conclusively established.

Whether trikresol is equally harmless and as effective as a preservative remains to be shown.

Hog cholera serum as generally prepared is not sterile. The blood as drawn from the serum producing animal is invariably contaminated and subsequent handling in defibrination allows for additional contamination, up to the time the preservative is added, varying in degree with the care exercised in its preparation. Even though it is possible to obtain sterile blood from a serum producing hog this can only be said of experimental trials and in producing hog cholera serum, defibrinated blood, in a practical way the question of sterility must be entirely sacrificed.

Carbolic acid will not sterilize this contaminated product and the question naturally arises does it hold the organism in check whether present in large or small numbers,"

Results of the experiment are briefly summarized as follows:

"1. Carbolic acid must be used in less than 0.75% to avoid changes in the physical appearance of hog cholera serum, defibrinated blood.

2. Trikresol must be used in less than 0.6% for the same reason.

3. Carbolic acid added in amounts up to 0.75% to lightly or heavily contaminated defibrinated blood first caused a decrease in

the number of bacteria followed by an increase exceeding the first bacterial count.

4. Trikresol with a carbolic acid coefficient of 2.87% added in amounts up to 0.6% was also followed by an increase then a decrease practically equal to that which occurred in the carbolized samples.

5. All of the controls, without any preservation, showed an increase in the bacterial count from the time the samples were first set aside (8-12°C) along with those to which a preservative had been added. This increase was followed by a noticeable decrease, and the last account was on an average lower in the control samples than those treated. That putrefactive changes took place was appreciated by the odor and liquefied appearance of the product.

6. No odor or putrefactive changes were observed in the carbolized and trikresolized samples. Both preservatives served well in this respect, but this alone must not be accepted as proof of the value of either preservative for defibrinated blood.

7. From the limited number of examinations made in these experiments, as to the types of bacteria which survive and then flourish in the carbolized and trikresolized samples, it can be said that the types were not limited to the spore forming bacteria alone, as organisms of the colon type, staphylococci and streptococci were found as long as the samples were kept.

8. Contaminated hog cholera serum, defibrinated blood, cannot be sterilized by the addition of carbolic acid and trikresol in practical amounts, and the numbers of bacteria are not kept in check by the preservative.

9. No evidence is brought forth here to show that carbolic acid or trikresol would not serve well as preservatives when added to a sterile product.

10. Hog cholera serum must be prepared in a sterile manner or sterilized by one means or another to enable carbolic acid or trikresol to serve as a satisfactory preservative.

11. The physical nature of hog cholera serum, defibrinated blood, probably has much to do with the limitations of carbolic acid and trikresol as preservatives, and it is highly probable that both would prove more effective if the insoluble, inert material, fibrin, cellular debris, etc., were eliminated from hog cholera serum. These inert materials undoubtedly exert a large influence in the compli-

cations following the use of the product, and for this reason alone should not be allowed to remain in hog cholera serum on the market."

REICHEL.

—O—

LACERATION OF THE STOMACH BY DUODENAL OBSTRUCTION DUE TO ASCARIDS. Veterinary Major Floriot. *Rec. de Med. Vet.* A gelding eight years of age had slight colics. Rectal injections were given and frictions of turpentine were prescribed. An injection of pilocarpine was made. No relief following after a few hours. 40 grams of tincture of opium were administered. The colic subsided but returned more violently the next day. Then the face had an anxious look; the body was covered with perspiration; the legs were cold; there were acid eructations and suddenly he dropped down and died.

At the postmortem the principle lesions were in the abdominal cavity. In opening it, there was an escape of red, wine-colored fluid mixed with food. The stomach was ruptured along the great curvature; the edges were ecchymotic and the mucous membrane was covered with bots in large quantity. There was one ascarid engaged in the pylorus. About sixty centimeters from the pylorus the duodenum was literally packed with ascarids on a length of 20 centimeters, making a most complete obstruction. About 100 worms were counted in the small intestine. The other organs were normal.

A. L.

—O—

MEAT DRIED IN VACUUM COMPARED WITH CHILLED AND FROZEN MEAT. (LA VIANDE DESHYDRATEE PAR LA VIDE, COMPAREE A LA VIANDE REFROIDIE ET CONGELEE) by Raynal; Paris. *Recueil de Médecine Vétérinaire*, Vol. 91, pp. 603-608, 1915. Certain French papers have advocated the use of meat dried in vacuum. The author claims that such meat cannot replace chilled or frozen meat. Theoretically, the outer dry layers should protect the inner meat fibers. Practically this is not true. Such dried meat requires great care in handling, as the outer dry layer is very fragile, easily breaking and exposing the inner part of the meat. The author recommends the following methods of preserving meat:

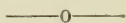
a—for short periods, from 8 to 20 days, but if possible, not to

exceed 10 days—chilling at minus 2 to plus 2 degrees C. (28–36 degrees F.)

b—for long periods, from 5 to 16 months—freezing at minus 5 to minus 28 degrees C (plus 21 to minus 18 degrees F).

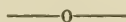
The author points out many of the disadvantages of the dried meat and the advantages of the other two varieties.

BERG.



EQUINE TUBERCULOSIS by Captain J. D. Broome, A.V.C., *Veterinary Record*.—This is the record of a post-mortem on a fourteen year old gelding which was destroyed on account of his condition: the cadaver was much emaciated. Stomach and intestines full of ingesta. Diaphragm studded with tubercles, varying in size from that of a barley grain to a pigeon's egg. The tubercles were over the muscular and tendinous portions of both surfaces of the diaphragm. The spleen had several large tubercles with numerous smaller ones over the peritoneal covering. Some were on the liver, close to the lymph glands. They were on the covering of the organ, none in the structure. The kidneys were normal. The renal lymphatic glands were enlarged and tuberculous. The glands near the pancreas were also diseased. There was one tubercle in the wall of the stomach close to its junction with the duodenum. The mesenteric, colic, internal and external iliac lymphatic glands were normal. The lungs were crammed with miliary tubercles but the pleura was free from them, except where it covered the diaphragm. The mediastinal glands, the bronchial and supra-sternal glands were also tuberculous. The submaxillary, the pharyngeal and post pharyngeal were also presenting different stages of the disease.

A. L.



THE ABDERHALDEN REACTION, D. D. Van Slyke, M. Vinograd-Villehur and J. R. Losee. *New York Jour. Biological Chemistry*, Vol. 23, pp. 377–406, 1915.—The present work was undertaken in the hope of providing for the measurement of serum protease a quantitative method sufficiently simple, accurate, free from subjective influence, and specific for proteolysis to afford definite conclusions concerning at least the facts of the Abderhalden reaction.

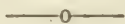
These experimenters did not use the Abderhalden ninhydrin test: instead a very delicate and accurate quantitative chemical method of measuring the extent of the ferment action was used. The preparation of placenta substrate, etc. was carried out as directed by Abderhalden and every precaution taken to insure freedom from error. They state "The difference even in the averages, is not great, however, and the individual variations of both pregnant and non-pregnant sera make the results from both overlap so completely, as to render the reaction, even with quantitative technique, absolutely indecisive for either positive or negative diagnosis of pregnancy. Further evidence of non-specificity is seen in the fact that carcinoma tissue was digested to about the same extent as was placenta."

For an interesting discussion of the nature of the Abderhalden reaction in immunological, rather than chemical terms, see Bronfenbrenner; *Biochemical Bulletin*, Vol. 4, pp. 86-89, 1915.

It is highly probable that above findings will weigh heavily against the acceptance of the Abderhalden test.

Similarly negative results with this reaction were obtained by Berg: Report of Chief of Bureau of Animal Industry, 1914, p. 32.

BERG.



LOCALIZED TETANUS by Doctor Pozzi. *Academie de Medicine*.—The author related one observation of localized tetanus, with a paralytic form of the lower limbs, appearing early, five days after the wound was received, viz: a severe injury of the left foot which had necessitated sub-malleolar amputation.

First, tonic spasms which later became very painful and yet remained localized to the left leg and thigh and were now and then manifested in the right also, leaving the patient no rest nor sleep. At first the temperature was elevated, but gradually dropped down. The cicatrization went on normally. The condition of the subject was very good. The treatment consisted in large doses of chloral and pantopon with massive doses of antitetanic serum. Great improvement has followed but slowly and the leg still remains convulsively contracted at the thigh. This stiffness will probably remain for a long time. Cases of limited or localized tetanus are very rare and those which affect only one leg are exceptionally observed.

A. L.

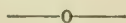
THE SEAT OF THE EMETIC ACTION OF VARIOUS DRUGS, Cary Eggleston and R. A. Hatcher, New York. *Jour. Pharmacology and Exper Therapeutics*, Vol 7, pp. 225-253, 1915.—Throughout this entire series of experiments (on dogs) it is to be observed that the smallest emetic oral dose was always larger than that required by intravenous administration, with but two exceptions, namely, the ipecac alkaloids, in which cases the doses for the two modes of administration were practically the same. In our previous studies on apomorphine and on the digitalis bodies the oral dose was also found to be materially larger than the intravenous dose.

Conclusions.—Practically all alkaloids and alkaloidal drugs in common use which produce nausea and vomiting, either as their chief or as their side actions, do so by direct action upon the vomiting center; i.e., morphine and preparations containing it, emetine, cephaelin, quinine, ergot, apomorphine, nicotine and lobeline, pilocarpine, aconitine, and veratrine.

Sodium salicylate, picrotoxin and the digitalis bodies also produce nausea and emesis through direct central action.

The evidence in favor of the central action does not in every instance exclude the possibility of the drugs also having an irritant action on the alimentary mucosa when given orally. It is probable that the ipecac alkaloids, veratrine and sodium salicylate may have this reflex action in man, at least in susceptible individuals.

Some of the advantages claimed for certain proprietary preparations of opium, such as narcophin and pantopium are refuted by the results of the present experiments, this is also probably true to a certain extent of some of the proprietary preparations of salicylic acid.



BERG.

THE LIFE HISTORY OF NEMATODIRUS FILICOLLIS, RUD., A NEMATODE PARASITE OF THE SHEEP'S INTESTINE. Charles N. Boulenger. *Parasitology, Cambridge (Eng.)*, Sept., 1915, v. 8 (2), pp. 133-155, pls. 8-9, text figs. 1-5.—In his historical sketch Boulenger notes that the common form from the United States, regarded by Curtice and by Ransom as *N. filicollis*, is *N. spathiger*. It also appears that the worms from Africa regarded by Maupas and Seurat as *N. filicollis* are *N. spathiger*. Boulenger is thus in accord with Railliet and Henry who were the first to call attention to the confusion between the species *Nematodirus filicollis* and *Nematodirus spathiger*.

Boulenger gives a detailed account of the developmental stages of *N. filicollis* from the egg to the ensheathed larva. Embryos develop in the eggs in water or moist feces if sufficiently aerated, the presence or absence of light being of little or no importance, while temperature conditions are, as usual, of great importance. The most favorable range of temperature is between 19° C. and 27° C. Eggs are in the 7 to 8 celled stage when oviposited and appear in the feces in this stage. The morula stage is attained in 3 to 4 days, quickly followed by the "tadpole" stage. At the end of 2 weeks the embryo is five times as long as the containing shell. During the next two weeks the young worm undergoes two moults, appearing at the end of this time as a transparent, highly refractive larva, enclosed in a sheath which consists of the unshed skin derived from the second moult and still surrounded by the skin shed at the first moult. It was found that these larvae would hatch from the shell more readily when submitted to alternate moistening and drying. It was found, however, that exposure to temperatures between 24 and 32° C. was much more efficacious in causing the eggs to hatch. Having undergone two moults within the shell, the larvae are in the third stage when they leave the shell and are about one millimeter long. A forking of the tail is a common abnormality.

It was determined that the larvae have the same habit of ascending blades of grass that Ransom described for the larvae of the stomach worm, *Haemonchus contortus*. (It is probable that this habit of crawling up grass blades and other vegetation, a device for attaining the digestive tract of the herbivore host, will be found to be quite general for nematodes having a simple life history and parasitic in such hosts. Ensheathed larvae were kept alive in water for over 11 months. They will survive drying and when dry will endure temperatures of 60° C., but are killed by exposure to over 50° C. in water. When dried they are very resistant to cold and withstand repeated exposure to freezing temperatures.

Under the influence of high temperatures, the larvae leave their ensheathing skins and this fact indicates that normally the skins would be shed under the stimulus of the body temperature when these larvae were ingested by the host animal.

M. C. HALL.

RESPIRATORY ANAESTHESIA IN ANIMALS. L. A. Merrilat, Chicago. *Jour. Comparative Pathology and Therapeutics*, Vol. 28, pp. 217-225, 1915.

1. For slight anaesthesia suitable for short operations the respiratory delivery is safe even in the hands of untrained anaesthetists.

2. For the profound anaesthesia required for serious and long operations respiratory anaesthesia is safe only in the hands of experts.

3. The most discouraging part of respiratory anaesthesia for animals is the difficulty of regulating the dosage. We need an apparatus to measure automatically the vapour delivered and consumed by the patient. (See abstract of paper by Meltzer below).

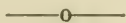
4. For profound anaesthesia of considerable duration, the best way to keep within the limits of safety is by administering a preliminary anaesthetic of chloral, followed by chloroform, and then maintain the narcosis with a terminal anaesthetic of alcohol, chloroform and ether.

5. Despite profound anaesthesia, exhaustion of the brain follows serious operations. This may be prevented by blocking with cocaine the nerve trunks which lead from the seat of operation. (It was Crile who demonstrated that the brain is being continually bombarded with impressions from the seat of operation in spite of even very profound anaesthesia).

6. The endotracheal delivery of respiratory anaesthetics is worthy of a trial. It is a step in the direction of dose regulation suitable for animals. (see Meltzer, below).

7. Intravenous delivery of ether and chloroform is unsafe with the apparatus we now have for their administration.

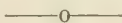
BERG.



THE METHOD OF INTRATRACHEAL INSUFFLATION, ITS SCIENTIFIC BASIS AND PRACTICAL APPLICATION. S. J. Meltzer, Rockefeller Institute, New York. *Berliner Klinische Wochenschrift*, Vol. 47, pp. 566-571, 1910.—In this method, a tube is passed through the mouth into the trachea until the end of the tube reaches to within an inch of the bifurcation. The other end of the tube is connected with an apparatus. This consists essentially of two bottles, one empty, the other containing ether, so connected with tubing that a stream of air can be sent through the empty bottle or through the ether, or

both, through the tracheal tube into the animal. By properly setting the stop cocks, the anesthetist can pass a carefully regulated stream of air and ether into an animal. This method has several advantages, among which may be mentioned: much less anaesthetic is needed because it is delivered directly into the lung. The amount can be controlled so easily that the animal can be promptly brought out of anesthesia or more deeply anesthetized. The excess of ether is swept out by the stream of air flowing, not into the lung, but out of it. This also prevents foreign particles from getting into the lung and obviates post operative pneumonia, so frequent in the ordinary anaesthesia. (See Merillat, above).

BERG.



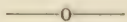
URTICARIA by E. Wallis Hoare, F.R.C.V.S. *Veterinary Record*. Well bred gelding, eighteen months old in good condition, has always been healthy. After being turned out on grass for two hours, his face and nostrils were noticed as being much swollen. The swelling increased rapidly, the eyes were closed and the sheath began to swell. When seen by the author he presented the following symptoms: nasal region, cheeks, nostrils and lips greatly swollen, breathing stertorous, nasal mucosa could not be explored. The eyelids were edematous and both eyes completely closed. The sheath was swollen and there was some paraphymosis. The case on superficial examination looked like purpura. The entire body was covered with an eruption noticed through the thick coat as hard flattened papules. Temperature could not be taken.

Was it a case of urticaria or one of purpura?

Treatment: Fomentations of the swollen parts. Steam inhalations. Potash chlorate twice a day. Electuary of terebene three times a day.

The next day almost all the symptoms were gone and the animal was looking for food. It was after all a case of urticaria which resembled purpura and could puzzle a beginner.

A. L.



THE ETIOLOGY OF "SYMPTOMATIC ANTHRAX" IN SWINE. "SPECIFIC GAS PHLEGMON OF HOGS" K. F. Meyer, University of California. *Jour. Infectious Diseases*, Vol. 17, pp. 458-496, 1915.—The

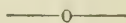
report describes the recognition in the United States of a disease of hogs, well described in European publications, which anatomically resembles symptomatic anthrax in cattle. The cases studied belonged to a small epidemic and are not sporadic cases as reported from Hungary. The lesions and the deaths of the animals were due to the Ghon-Sachs bacillus, which was properly identified by all well known means. Etiologically, the American cases are therefore identical with the European ones.

In animal pathology this bacillus unquestionably plays an important role. The various descriptions given by Miessner, Markoff, Levens and others for anaerobic organisms responsible for parturient symptomatic anthrax, bradsot of sheep, and blackleg of horses, correspond in almost every point with the facts brought out by this study. Most of the workers, however, did not extend their studies sufficiently far to enable them to identify the organisms with the Ghon-Sachs bacillus.

The Ghon-Sachs bacillus has many characteristics in common with the blackleg bacillus (*bacillus gangraenae emphysematosae* or as it is also called, *bacterium Chauveani*) and extensive testing is required for their differentiation. But this can be done with certainty by using the various serological tests described.

The name "specific gas phlegmon of hogs" is proposed by the writer for the disease, which, though resembling blackleg or symptomatic anthrax in cattle is distinct from it.

BERG.



TREATMENT OF PERVIOUS URACHUS IN FOALS by J. H. Parker. *Veterinary Record*.—The writer has had over 20 years experience in a district where all kinds of foals are bred and has seen a great deal of pervious urachus and joint evil. For the former, he cast the foal, turned it on its back, injected two drams of tincture of iodine into the urachus. With needle and silk he passed through the skin surrounding the urachus, as a ligature a knot and applied plenty of boric powder and let the whole slough off. He then injected the foal with *Staphylococcus albus*, *citrus*, *aureus*, and every thing went all right. This treatment answers well also for joint evil.

A. L.

HEMORRHAGIC LEPTOMENINGITIS AND LYMPHADENITIS IN ANTHRAX. Dr. Fritz Herzog. *Beiträge zur pathologischen Anatomie und zur allgemeinen Pathologie*; Vol. 60, pp. 513-543, 1915. University of Greifswald, Germany.—A very detailed description of the post-mortem findings in three cases of anthrax in man. In two of these there were pustules on the face, on the other, on the hand, which were regarded as the seats of infection. All three ran a similar course, favorable in the beginning of the disease, followed by sudden onset of grave general symptoms, and death soon resulting. On autopsy, all three showed a severe "Leptomeningitis anthracica" while the other organs showed only slight pathological changes. The blood vessels in the arachnoid and pia membranes were affected; a layer of blood covered the cerebral hemispheres and filled the fissures.

BERG.

In an opinion rendered by attorney general Atwill of Boston, Mass. and accepted by the governor and council, Dr. Lester H. Howard will have two years more to serve as commissioner of animal industry. Charges against Dr. Howard's administration had been brought before the governor's council due to losses occasioned by closing the cattle market during the quarantine of a suspected case of foot-and-mouth disease. The losses were proved, but the responsibility was shown to have been the owners'. The quarantine was shown to have been good judgment and the length of time not unreasonable.

The decision meets the approval of the Massachusetts veterinarians generally and indicates a determination to place such an important department as that of animal industry beyond the vagaries of changing political administrations.

SALARY INCREASE FOR VETERINARIANS (Department of Health) \$1,320 per annum (\$1,800 to \$2,340 increase has been urged)—Applications issued at Room 1400, Municipal Building up to 4 p. m. January 31: Subjects and weights: Experience, 3; Technical, 7. Candidates must be licensed to practice in the State of New York. Knowledge of contagious diseases of animals necessary, ante-mortem and post-mortem inspections at slaughter houses are part of duties. Age limit 21 years. For further particulars see "City Record" or apply Municipal Commission, New York City.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

REPORT OF THE COMMITTEE ON VETERINARY EDUCATION IN VETERINARY COLLEGES.

(Continued from page 496)

It is undoubtedly true that much of the instruction now given at agricultural colleges is unwise and unprofitable to agriculturists yet the instructor in veterinary science is placed in a difficult position. He is tempted on the one hand to give the student an attractive and interesting course, fill his department with students, and ends in graduating a bunch of "quacks". The work must somehow be made interesting and yet not defeat itself by creating an impression in the minds of the students that they are trained graduates of veterinary medicine. That this condition prevails is shown by a statement of one college in its catalogue, as follows:

'It is not the object to turn out professional veterinarians, as this is impossible with the time, equipment, and teaching force allotted this department. Students desiring to graduate in veterinary medicine will find it advantageous to complete the agricultural course, then enter the veterinary medical department of some well-equipped school. This course is intended only to aid in the study of agriculture. Its aim is to instruct students in the care of live stock in health and disease. Particular attention is given to the prevention of disease. The course is as practical as it can be made. The student first studies the structure of the animal body and its normal functions. The abnormal is next taken up, including the non-infectious and contagious diseases, together with lameness and soundness.'

However, as before stated your committee has considered this matter very carefully and begs to submit recommendations as follows:

SUGGESTIONS REGARDING A COURSE IN VETERINARY SCIENCE FOR AGRICULTURAL STUDENTS.

RECOMMENDATION No. 1. That at least one veterinarian, who shall be a graduate of an accredited veterinary college, shall be employed and devote his whole time to teaching veterinary science subjects and experiment station work.

RECOMMENDATION No. 2. That a pre-requisite to the study of veterinary science for agricultural students shall be a knowledge

of elementary physics, chemistry, general zoology, general botany, microscopy, or general bacteriology.

RECOMMENDATION No. 3. That a further pre-requisite to the study of veterinary science for agricultural students shall be instruction in animal husbandry and dairy husbandry, which shall include animal breeding, feeding of domestic animals, live stock judging, and handling of dairy products. Advanced live stock judging, conformation and soundness should not be given until the students have had a course in veterinary anatomy and physiology to familiarize them with the structure of the animals with which they are to deal as a whole.

RECOMMENDATION No. 4. That instruction be given in veterinary anatomy to include the dentition of farm animals, a study of the skeletons of the horse and the cow with reference to the skeletons of other domestic animals, and sufficient dissection of either large or small animals to familiarize the student with the gross structure of the important muscles, blood-vessels and nerves and the organs of digestion and reproduction.

RECOMMENDATION No. 5. That instruction be given in general physiology and veterinary hygiene. The latter at least to be taught by a veterinarian. The teaching in physiology to make constant reference to the comparative physiology of domestic animals and to be supplemented by experiments in the physiological laboratory.

RECOMMENDATION No. 6. That instruction be given in the reproduction of farm animals, the hygiene of pregnant animals, normal parturition, care of the new born, weaning young animals, etc.

RECOMMENDATION No. 7. That instruction be given in the common or sporadic diseases of live stock caused by injurious forage plants, improper care and handling, and the common remedies indicated with special emphasis on the cause and prevention of such diseases. This instruction to include lectures on horse-shoeing and lameness.

RECOMMENDATION No. 8. That instruction be given in practical laboratory work during the last year, either at a veterinary hospital or on the live stock of the college. This instruction should not develop into a regular veterinary clinic such as belongs to the strictly technical field of a veterinary college, but should include demonstrations in harnessing, hitching, driving and handling of horses, as well as the breaking in of colts, unless such demonstrations have been given in animal husbandry work, animal restraint, bandaging, methods of administering medicines, reading of temperatures, pulse, respirations, etc.

RECOMMENDATION No. 9. That instruction be given in the final (senior) year in the animal plagues or infectious diseases of animals; their causes (pathogenic bacteria); their recognition and control. This instruction to include sanitation to prevent the spread of infection, and inspection to prevent the consumption of the meat of diseased animals.

RECOMMENDATION No. 10. That the fundamental idea of the instruction in veterinary science and allied subjects in agricultural colleges should be for the purpose of teaching the future farmers and live stock growers the best methods for raising and maintaining healthy animals and not attempt to qualify agricultural students to become veterinary practitioners. This result depends largely on the teacher, and it is recommended that the veterinarians employed should teach with the object in view of educating well equipped stockmen and not of developing veterinarians qualified to practice.

A. M. FARRINGTON,
PAUL FISHER,
JAS. B. PAIGE,
Committee.

PRESIDENT MARSHALL: What do you wish to do with the report of the special committee on the agricultural college investigation?

DR. KEANE: I move the acceptance of the report. Seconded.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the special committee on agricultural college investigation be received. Any remarks. If not, it is so ordered.

The secretary having now produced the report of the committee on veterinary anatomical nomenclature, we will listen to the report, read by Dr. Newsom.

The signed report of the special committee on anatomical nomenclature is as follows:

REPORT OF THE SPECIAL COMMITTEE ON REVISION OF VETERINARY ANATOMICAL NOMENCLATURE.

To the American Veterinary Medical Association,

GENTLEMEN:

Your committee on revision of veterinary anatomical nomenclature begs to submit the following report:

The work has proceeded on the principles which were laid down in the preliminary report adopted by the association in 1912, and which were followed in the report of the following year. The report now submitted comprises the names for the circulatory system, the nervous system, the organs of the senses, and the common integument.

The great majority of the terms were agreed to unanimously by the committee; in quite exceptional cases a decision was reached by a majority vote. The committee feels more strongly than ever that in debatable cases agreement on the selection of a term is the prime desideratum, and that personal preferences, even when well-grounded and strongly held, should not be permitted to block progress toward substantial uniformity. It is a pleasure to the chair-

man to say that this attitude in the members of the committee has greatly facilitated the work.

The committee has been extremely conservative concerning the introduction of new names. On the other hand it has rejected many terms which appeared to be superfluous, keeping constantly in mind the urgent need of greatly diminishing the number of names.

It will be noted that a number of terms which refer to special features in the anatomy of birds are included in a separate list at the end of the report, instead of appearing in their systematic order. The explanation of this circumstance is that the committee thought it advisable last year to defer these on the ground that they were relatively of secondary importance and that the consideration of them might involve so many problems as to prevent the presentation at this time of a report otherwise fairly complete. It may be added that the list of special avian terms embraces only those names which appeared to the committee to be necessary for veterinary purposes.

The committee recommends the following terms which were inadvertently omitted from previous lists:

- P. 197 Ala ossis sacri
- P. 199 Planum temporale (ossis parietalis)
 - “ Facies orbitalis (partis orbitalis)
 - “ Facies nasalis (ossis frontalis)
 - “ Apex (partis petrosae ossis temporalis)
- P. 201 Facies nasalis (ossis zygomaticis)
- P. 202 Sutura squamofrontalis
 - “ Sutura nasolacrimalis
- P. 210 M. cervicalis ascendens
- P. 216 Pila coronaria dorsalis (ruminis)
 - “ Pila coronaria ventralis (ruminis)
- P. 221 Lig. teres vesicae

The names submitted herewith were filed with the secretary last November in order to comply with the instruction of the association that the report be printed and sent out to those interested, thirty days before the next meeting.

(Signed) SEPTIMUS SISSION, *Chairman*.

I. E. NEWSOM

S. L. STEWART.

(Page numbers refer to Proceedings of A. V. M. A.)

PRESIDENT MARSHALL: What do you wish to do with the report of the committee on veterinary anatomical nomenclature?

DR. KINSLEY: I move that the report be accepted and referred to the committee on publication.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the committee be accepted and referred to the committee on publication. Any remarks? If not, and there are no objections, it is so ordered.

The next on the program is the report of the committee on glanders. The secretary tells me he has not received such a report. Some members of that committee are present. Perhaps they may have some remarks to make on that report. Is Dr. Eichhorn, or Dr. Keane, or Dr. McGilvray, all members of that committee present, and if so, have either of you any remarks to make? If not, it may be possible to call for that tomorrow.

DR. MAYO: The meeting of the Alumni of the New York College of Veterinary Surgeons, the American Veterinary College, the Columbia Veterinary College, and the New York Veterinary College, will be held in Room 109, Mezzanine floor, tonight at seven thirty, just before the reception.

PRESIDENT MARSHALL: Any other business to come before the session this morning? If not, we will adjourn until tomorrow morning. We will hope to have the report of the international tuberculosis commission and the committee on necrology before the session in the morning.

A motion to adjourn is now in order.

Which motion being made and seconded, was carried and the meeting was adjourned until the following morning at nine thirty o'clock.

Oakland, California, September 1, 1915.—The fourth business session of the fifty-second annual meeting of the American Veterinary Medical Association was called to order by the president, Clarence J. Marshall, at 9:30 o'clock, A. M.

PRESIDENT MARSHALL: The first thing on the program this morning is the report of the executive committee.

DR. MAYO: The executive committee begs to report the following:

“In accordance with the recommendations from the president and secretary, it is the opinion of the executive committee that the present methods of publishing the proceedings and papers of the association are not conducive of the best interests of the association and the veterinary profession as a whole, and,

Whereas, It is believed that the nature, age and purposes of the association warrant the establishment of an official organ for the association,

Therefore, Be It Resolved, That the executive committee, at its annual meeting now in session convened, be authorized by this association to take such measures as may be necessary to establish an official organ of the association to be known as *The Journal of the American Veterinary Medical Association*, and be it further

Resolved, That the executive committee be authorized to appropriate such moneys from the general funds of the association or by assessment as provided

by the by-laws as may be necessary to carry into effect the intent and purposes of this resolution, and be it further

Resolved, That the executive committee as constituted at this present convention, be continued as a committee on journal to take the place of the publication committee until otherwise provided for, and further be invested with the necessary powers to carry into effect the intent and purposes of this resolution."

PRESIDENT MARSHALL: Gentlemen, what will you do with the recommendation from the executive committee?

DR. HOSKINS: Mr, Chairman, in order to have the matter before the association, I move that the recommendation of the committee be accepted.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion. It has been moved and seconded that the recommendation be accepted. Any remarks?

DR. STEWART: Mr. President, there is just one paragraph I do not like. I think it was the last one in reference to the continuance of the same executive committee. What was that?

DR. MAYO: "And be it further resolved, that the executive committee as constituted at this present convention, be continued as a committee on journal to take the place of the publication committee until otherwise provided for, and further be invested with the necessary powers to carry into effect the intent and purposes of this resolution."

DR. STEWART: I thought I heard that right. And does that include all the ex-officio members of that executive committee, or only the appointed committee?

PRESIDENT MARSHALL: I understood it included all the elected and appointed officers of the executive committee. Is that your understanding of it?

DR. MAYO: I suppose so.

DR. KINSLEY: Mr. Chairman, I would like to know if the committee has estimated the cost of publishing a journal by setting forth the proceedings in the same manner as heretofore arranged.

DR. MAYO: I will state that there has been estimates made upon this. It is the opinion of those well posted to estimate, Dr. Campbell and others, that the publication of the Journal, properly carried out, will prove really a source of profit to the association. At the present time the publication will probably cost, we will say, approximately, four thousand dollars a year. Another estimate from the editor and publisher of a Medical Journal with many years experience, thought possibly the cost to the association would be two thousand dollars the first year to publish, or rather to establish the publication of a Veterinary Journal and after that, it would be self sustaining.

DR. KINSLEY: Mr. Chairman, I would like to ask a question. The executive committee, why do they consider it essential to continue this present executive committee as the publication committee? What is the object of such a large committee?

DR. MAYO: I would say, in a general way, that this is a new venture and it will be necessary to give the executive committee a comparatively free hand the first year in establishing an official Journal.

DR. HOSKINS: I think it would be a very unwise thing to place it in the hands of the new body which have not gone over all of the various aspects of the proposition. The proposition of having the matter remain in the hands of the men who have gone over the proposition thoroughly, commended itself very highly to me. These men, the present members of the committee, have gone over all the various aspects of the case and are prepared to enter upon the work of carrying out the plan of the association, which is the hardest part of the work, and I am sure you will agree that any new work requires a great deal of study and thought and it was my idea that these men, who have thought out the situation as far as they can, should be ready to carry on the work of establishing a Journal, at least for the first year. That proposition commended itself very highly to me, that is, that it should remain in the hands of this committee, in view of the fact that they are better prepared to carry out the views of the association if it is decided to establish the Journal as recommended by the committee. These men have gone over the situation very thoroughly, have studied the various aspects of the case and therefore, would be more likely to carry out the enterprise to a successful conclusion. Then with newly elected officers, the body of men would not be acquainted with the proposition at all.

DR. CAMPBELL: To my mind, there is no question about the advisability of the action taken by the executive committee, that is, to start a Journal and after serious thought, I think they have gone about it the best way, under the best plans, to achieve greater success. It seems to me this report has come at an unfortunate time for in a few minutes we are to consider a report on reorganization and whether favorably or otherwise, that does not make much difference because we are going to decide whether we want it or whether it is going to be adopted or rejected and it seems the reorganization would have a great bearing upon the matter of publication. The change suggested by the plan of reorganization I believe would very much favor the successful adoption of this organization. I am not so sure that under our present system, a system designed many years ago for the association, confined as it was to a small locality and with no thought of any undertaking of this kind, could be successfully carried on. That is one point. I would rather see the consideration of this resolution postponed for say, thirty minutes, so we could consider the other matter first. It seems to me unfortunate, that the executive committee did not think of that and give us an opportunity to know what we were doing before we did it. There is a further objection. The present executive committee has served its time and is about to retire, another day and their time is up. If our new president knew that something of this kind was to be taken up by the executive committee, it might influence him in their appointment. It will be essential that the committeemen, at least the managing part of that committee live somewhat closely together so that they can get together without great expense. That matter might be taken into consideration in the appointment of the new committee. In other words, this committee which was appointed two years ago for an entirely different purpose and I am just wondering if a new committee with this idea in mind might make a difference with the committee on publication. I say this, of course, without any reflection on the members of the committee. I think the disadvantages of their serving is more a matter

of location than otherwise, that is, their being widely separated. Of course, every committee should be representative of the whole association. I should like to move that this report be laid aside until some action has been taken on the report of the plan of reorganization. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion by Dr. Campbell, which has been seconded by Dr. Kinsley. What is your pleasure, any remarks? If not, are you ready for the question? Those in favor of delaying action upon this recommendation of the executive committee, until the reports have been submitted in reference to the reorganization plan, signify by saying, "aye." Those opposed, the same. It is so ordered.

We will now hear the report of the executive committee in regard to the plan of reorganization.

DR. MAYO: It is recommended by the executive committee that the revisions of the constitution and by-laws be re-committed. I might say in explanation, that the executive committee are fully convinced of the need of a revision of the constitution and by-laws, but are also convinced that a much more important measure for the government of the association is the publication of an official Journal, and the committee feels that the first year would indicate to the committee much better than they understand now, the necessary changes that would have to be made to conform to the conditions as they arise in the publication of a Journal.

It will also give through the Journal an opportunity for the members throughout the country to discuss this question and become thoroughly informed as to the needs of a new constitution and by-laws, as possible. We feel that it would stimulate the interest by having this revision discussed through the Journal throughout the year and the different plans outlined so that it would come directly to every member and for that reason, it would be advisable to re-commit this question of the revision of the constitution and by-laws.

DR. HOSKINS: Mr. President, I move that we approve that recommendation and in so moving, I want to say that I believe we have done the right thing and I have thought that in this proposed revision, which we all hope may last and be better than the original constitution and by-laws, that we ought to have the largest number of members present, which it is possible to have so that when it is considered and adopted, it has been done with the approval and consideration of the largest possible proportion of our members.

We have here in California, less than one-tenth of the membership of this association at this convention and it does appear to me that in taking up the revision of the constitution and by laws and the making of rules, which would be permanent for at least a number of years, that one-tenth of the membership is not sufficient to adopt such an important measure.

I feel that the very fact that the distance which separates us from a large portion of the members of the association ought not to deprive them of the opportunity of joining in the consideration of this proposition. I endorse the statement of the secretary that if we are going into the publication of the proceedings, that the intervening year, before the final action shall be taken of the revision of the constitution and by laws, will be largely spent in giving every

one an opportunity to determine how best to make this revision, how best to direct the affairs of the association along the lines to secure larger and better interest for the association.

DR. MAYO: Mr. President, I wish to make it plain to every one that in discussing this question, we wish to express our highest appreciation to the committee that has had this matter in charge, for the large amount of efficient work that they have done. In re-committing this, they are to understand there are no objections to the committee at all.

DR. STEWART: I regret that the recommendation of the executive committee that this be re-committed does not carry with it some proposal for submitting the proposition as now presented or which might be re-committed to the committee, to work over and be presented to the membership at large. In the remarks of the Secretary and of Dr. Hoskins, it is pre-supposed that we shall adopt the resolution which has since been postponed and in the failure of its adoption, there is no provision in it for bringing before our entire membership this whole subject that they may digest it thoroughly and be prepared to discuss it at another meeting. I hope that the first resolution will carry. In the event that it fail, there should be in this resolution, provision made for its presentation to the entire membership.

DR. MAYO: Mr. President, in order to make amendments to the by-laws and the revision to the constitution, it must be left open one year previous. I mean to say a notice must be given one year previous. Now this leaves everything wide open, so that at the next meeting we can revise the constitution and by-laws in any way we may see fit and all the different plans that have been presented will still be before the association for consideration.

DR. STEWART: Mr. President, at the time the supposed alteration of the constitution and by-laws was first brought before the association, notice was given the year before. At the time of the annual meeting a resolution was made that the proposed alteration should be printed and distributed to the members that all might have a chance to study these alterations. The recommendation of the executive committee thus presented, does not make any provision for such a distribution. That is the point I was raising: This I hope can be modified. It should be printed and distributed prior to our next meeting if not through the medium of a journal, if we should fail in passing that resolution, then through some other medium.

DR. MAYO: In reply I will say to the members present, that the report of the committee as constituted at the previous meeting has been presented and is ready for distribution here and also I have copies of the old constitution and by-laws here. I will say that this was received by the secretary for distribution, a day or two before I left for this meeting and I was unable to send them out and distribute them to the members of the association so that they would receive it before leaving for this meeting. Consequently, I brought them here and they are ready for distribution.

DR. HUGHES: Will the secretary kindly explain to us just why this delay should occur? Who is responsible for the printing of these proceedings, or rather revision of the constitution and by-laws and who is responsible for not distributing them before now?

DR. MAYO: In reply to Dr. Hughes' question, I might state that I am unable to state definitely who was responsible. I suppose the committee. They published it in reply to repeated requests from me. I supposed it was going to be turned over to me for publication and I wrote the chairman of the committee, several times, telling him that it must be in my hands at a certain time, so I could get it out the first of August. I did not receive it or any particular information regarding it. I did receive them just before I left Chicago and I brought them with me. I did not think it was advisable to distribute them before the association until the question came up. It was not with any idea of keeping the information away from the members that I failed to distribute these before this time but I have been rather busy and I just simply didn't think of presenting the question and distributing them until it should come up in the meeting as I knew this question would come up, I brought them here and they are here now for distribution if you want them. They have been here two days.

DR. CAMPBELL: I want to ask several things. One thing to correct some of the statements of the secretary, which he has made, believing them to be right, and also to answer some of Dr. Hughes' questions. The report which the secretary has on his table, is not the report of the committee on revision. It was not published by the committee on revision. It is a report that was published by the chairman of the committee, gotten up by him without consulting the other members of the committee and before coming to the executive committee, it was practically re-written. I hope it will not be distributed here. The distribution will do no harm but I hope it will not be distributed to the members with the idea that this is what the executive committee has been considering, what they have asked to have re-submitted, because it is not. The plan of reorganization is not the same.

DR. MAYO: Mr. President, the only information that I have is that this is a printed report of a special committee upon reorganization from the American Veterinary Medical Association, with the names of H. D. Gill, D. M. Campbell, T. E. Maloney, George H. Hart, and P. Fischer, on it.

DR. HART: I never knew that Dr. Gill was revising the constitution and by-laws until I received a printed copy two or three minutes ago and we were not consulted in the matter. The copies which have been presented to the committee are entirely different documents and if the members of the association are going to consider a revision of the constitution and by-laws, I would recommend that the copy which is now in the hands of the executive committee be printed in place of the document which has already been printed and ready for distribution, signed by Dr. Gill and of which the committee knew nothing.

DR. CAMPBELL: I don't understand the secretary when he says that he received the report of the committee and accepted it as such. I don't know whether he merely said he received a certain report without accepting it official. I say that report purporting to be a report of the committee, never presented to the committee and the committee took no action on it and I don't have the report which is now in the hands of the executive committee and as I understand, which the committee recommends to have re-committed is not the report which the secretary has here. That is an entirely different report.

DR. MAYO: Mr. President, all the information I have from the committee at all in any way, is the printed report which I received and supposed it was the unanimous report of the committee, it having the names of the committee on it. I had no information to the contrary. Now two members of the committee come up and say it is not the report of the committee. Now you decide the question. I don't know about that.

DR. HOSKINS: I move that the report of the committee be accepted and that the matter be re-committed. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: It has been moved and seconded that the report of the committee be accepted and that the matter of reorganization be re-committed. All those in favor, signify by saying, "aye."

DR. CAMPBELL: Mr. President, This committee has worked on this for three years and it has worked hard since this meeting began. They have brought the report of their labors to the association and hearing at this time has been denied them. They have been denied the opportunity to present their report. I think if they were disposed to insist upon it that courtesy to the committee alone would require you to listen to it and that the members of the committee should have been consulted further in this matter, however, since talking this over, we have decided that this should have further consideration and to forego any rights we have to a hearing, therefore, I wish to second this and hope that it will pass but that you will allow this committee to retire and require nothing further of it.

PRESIDENT MARSHALL: The question is, will we accept the recommendation of the executive committee?

DR. STEWART: I would like to be set right on what I am going to vote on. Is this to be re-committed to the executive committee or re-committed to the committee on reorganization

DR. MAYO: On reorganization, I suppose.

PRESIDENT MARSHALL: As we understand it, the question is, it is to be re-committed to the reorganization committee.

DR. KINSLEY: Is this same committee to be continued?

PRESIDENT MARSHALL: It does not necessarily mean that.

DR. HUGHES: In view of this fact, do you think you can make any progress a year from now by the re-appointment of this committee, in view of the fact that such a fiasco has been made of this thing? Who is responsible for this condition? It seems to me there should be a motion made to table this thing and let us start all over again.

PRESIDENT MARSHALL: Any further remarks?

The question has been called for. All those in favor of accepting the recommendation of the executive committee that the proposition of the revision of the constitution and by-laws be re-committed, make it manifest by saying "aye", those opposed, "no." The "ayes" have it; it is so ordered.

(To be continued)

SOCIETY MEETINGS

The tenth annual meeting of the Mississippi State Veterinary Medical Association was held at Columbus, Miss., January 11-12. The following program was presented:

President's Address.....Dr. W. L. Gates
 Address of Welcome.....Dr. W. J. Lipsecomb
 Response.....Dr. E. M. Ranck
 Address.....by the Mayor of Columbus, W. C. Gudnter
 "Efficient Animal Motors" as "Economic Factors in Crop
 Production.....Dr. J. C. Robert
 Hog Cholera and its Prevention.....Dr. S. E. Osborne
 Colitis in Horses and Mules in the Mississippi Delta.....
Dr. V. H. Knutzen
 Hook and Stomach Worms of Young Calves.....Dr. E. Barnette
 Texas Fever and its Treatment.....Dr. D. S. Taylor
 My Experience in the Treatment of Equine Colic. Dr. J. T. Alston
 Veterinarian's Duties.....Dr. W. P. Ferguson
 Infection and Immunity.....Mr. Earl A. Keinzey
 Foot-and-Mouth Disease.....Dr. J. A. Barger
 The Future of the Veterinary Profession in Mississippi..

.....Dr. E. M. Ranck
 Bovine Tuberculosis.....Dr. Hudson Chadwick
 Little Things.....Dr. O. M. Norton
 Common Wounds and Their Treatment.....Dr. J. A. Beavers

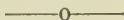
The clinic was held at Dr. Oliver's hospital. The following demonstrations and operations were performed:

1. Methods of Passing Stomach Tube and its Indications..
Dr. J. T. Alston
2. Amputation of Penis of Horse—Vaginal Ovariectomy in
 the Mare.....Dr. James Lewis
3. Firing for Spavin and Ringbone.....Dr. J. D. Townsend
4. Digital and Plantar Neurectomy and Indications for
 Operation.....Dr. B. M. Leigh
5. Arytenectomy.....Dr. S. E. Osborne
6. Trephining Facial Sinuses.....Dr. J. F. Barnett
7. Castration of Cryptorchid Horses.....Dr. J. A. Barger

Drugs and instruments displays were made by the following firms: H. K. Mulford Co., Philadelphia; Haussmann & Dunn, Chicago; John T. Milliken & Co., St. Louis; American Veterinary Supply Co., Kansas City.

The association contributed twenty dollars to the Salmon Memorial Fund and adopted the Blue Cross Emblem. The officers elected for the following year are: President, Dr. James Lewis, Greenwood, Miss.; Vice-President, Dr. J. T. Alston, Tupelo, Miss.; Secretary-Treasurer, Dr. E. S. Norton, Greenville, Miss., re-elected. The next meeting will be held at Clarksdale, Miss., January 10 and 11, 1917.

E. S. NORTON, *Secretary*.



THE EIGHTH ANNUAL VETERINARY CONFERENCE AT ITHACA, N. Y.,
JANUARY 11 AND 12.

A large number of veterinarians were in attendance from various parts of the state. After some introductory remarks by Dean Moore, interesting papers were presented on Lead Poisoning, by Dr. Williams; Hookworms in Dogs, by Dr. Muldoon; Diagnosis of Swamp Fever, by Dr. Udall and Surgical Treatment of Necrosis of the Lateral Cartilage, by Dr. Adams of Philadelphia, with discussions.

In the afternoon there was a symposium upon biological products: a general survey of the field was offered in a most instructive paper on the Therapeutic Value of Biological Products in Veterinary Practice by Dr. Eichhorn of Washington, D. C. This was followed by a discussion from the manufacturers point of view, by Drs. Mayo of Chicago, King of Detroit and Reichel of Philadelphia. Following this was a discussion from the practitioner's standpoint, participated in by a number of veterinarians. Some favorable and some unfavorable testimony was offered but there was an evident tendency of a get together spirit between the producers and the users and a desire to meet on common ground so far as the limitations of biological knowledge would permit.

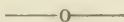
In the evening after a few words of welcome from Professor Sheared, as proxy for President Schurman, a most practical and illuminating address was listened to on the Relation of the Veterinarian to the Animal Industry of the state, by Dean Cook of the St. Lawrence School of Agriculture. Dean Cook's logic and dry humor kept the audience interested from start to finish. After some remarks on the New Re-registration Law by Dr. Stone a smoker was held.

On the second day the morning program included papers on Infectious Abortion, by Dr. Williams; Time is Money, by Dr. F. H. Miller of New York City; Verminous Bronchitis in Dogs, by Dr. Milks; Control and Eradication of Infectious Mastitis in Dairy Herds, by Dr. Moak of the Medical Milk Commission of Brooklyn. During the noon hour there were meetings of the Alumni Associations and a light lunch was served.

In the afternoon there was a demonstration of technique in immunizing hogs with anti-hog-cholera serum, by Dr. Milks followed by clinics in the small animal, medical and surgical departments.

In the evening a banquet was held at the Clinton House at which Dean Moore presided at Toastmaster. The list of speakers included Professor Shearer, Dr. Adams, Dr. Miller, Dr. Wills, Dean Galloway, Dr. Fish and Dr. Mayo. A committee, consisting of Drs. Ackerman, Williams and Fish was appointed by the toastmaster to send a cablegram to Dr. Liautard. The following message was sent: "Dr. A. Liautard, Bois Jerome, France. Appreciate past, sympathy for loss, hope for future."

P. A. F.



MEETING OF THE OHIO STATE VETERINARY MEDICAL ASSOCIATION JANUARY 13 AND 14.

The State Veterinary Medical Association of Ohio held its thirty-third annual meeting on the campus of the Ohio State University, Columbus, on January 13th and 14th.

The unusually large attendance, the excellent program and the interest manifested by those in attendance are further evidence that conditions veterinary are not at a standstill in Ohio, but are improving rapidly each year. An attendance of almost four hundred was recorded. Fourteen of our most widely known commercial houses made excellent exhibits and many sales.

The feature speaker imported for this meeting was Dr. Louis A. Merillat of Chicago, who addressed the organization on "The Surgery of Fistulous Withers", demonstrating the same on a patient secured for the purpose. Assisted by Dr. J. H. Blattenberg, he also demonstrated "The Technique of Post Mortem in the Field". So well was Dr. Merillat received by the association that he, a native Buckeye, by the way, was elected an honorary member.

The dinner session, attended by one hundred and fifty, was held in the Ohio Union, Ohio State University, and proved a joyous

occasion. Just as the toasts were over and all were expecting to be formally dismissed, The Kaiser (Dr. J. H. Blattenberg of Lima) "rode" into our midst on "The General" (artificial horse) and with his strong cast of Mutt, Jeff, Henry Ford, The Royal Horse Doctor and The Royal Chamber Maid, "put on" an act entitled—"The Horse in War and After". It was a "scream".

The election of officers for 1916 resulted: President, Dr. Reuben Hilty, Toledo; Vice-President, Dr. Harry T. Moss, Dayton; Secretary, Dr. F. A. Lambert, Columbus; Treasurer, Dr. David S. White, Columbus.

Thirty-five new members were voted into the association, making the present membership slightly over three hundred.

The very excellent committee reports have been a marked feature of our last few annual meetings.

The program follows.

Influenza in the Horse with special reference to the Pectoral Form.
Dr. N. D. Backus.....Elyria

Discussion by—Dr. W. A. Brown, Columbus and Dr. A. E. Metzger, Clyde.

The Significance of the Fever Complex in the Cow.

Dr. R. A. Greenwood.....Painesville

Discussion by—Dr. R. J. Bernath, Wauseon and Dr. George Kinsey, Wheeling, W. Va.

The Surgery of Fistulous Withers.

Dr. Louis A. Merillat.....Chicago, Ill.

Some Conditions in Hogs Simulating Hog Cholera not amenable to the serum treatment.

Dr. O. D. Maddux.....Washington, C. H.

Discussion by—Dr. Howard Miller, Columbus and Dr. C. W. Fogle, Leipsic.

Fractures.

Dr. E. V. Hover.....Convoy

Discussion by—Dr. W. G. Cook, Findlay and Dr. H. Worcester, Middletown.

DINNER SESSION

Toastmaster.....President F. F. Sheets

Toasts:—

Hon. Ralph D. Cole.....Columbus

Hon. John F. Kramer.....Mansfield

Dr. John V. Newton.....Toledo

Dr. Walter Shaw.....Dayton
Music by the University String Quartette.

- VETERINARY CLINIC BUILDING

Report of some cases which did not recover.

Dr. C. B. Frederick.....Canton
Discussion by—Dr. F. R. Butz, Cincinnati and Dr. Sidney
Meyers, Wilmington.

Some points relative to passing the Stomach Tube in the Horse.

Dr. John N. Shoemaker.....Columbus
Discussion by—Dr. C. H. Case, Akron and Dr. R. D. Way,
Cleveland.

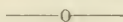
Operation—Fistulous Withers.

Dr. L. A. Merillat, Chicago, assisted by Dr. J. H. Blattenberg,
Lima.

The Technique of Post Mortem in the Field.

Dr. L. A. Merillat and Dr. J. H. Blattenberg.

F. A. LAMBERT, *Secretary*.



SOUTHERN TIER VETERINARY MEDICAL ASSOCIATION

The second semi-annual meeting was held at Elmira, December 30, 1915, at the Hotel Rathbun. The forenoon clinic was held at Dr. Battin's hospital at which operations for quittor were performed by Drs. Muldoon and Axtell. The following papers were presented and discussed: Atypical Cases of Blackleg, Hugh M. Barnes; Treatment of Thoroughpin, J. N. Frost; Swamp Fever, C. P. Fitch.

Dr. Wills of the state department of agriculture made some extemporaneous remarks on Veterinarians and Tuberculin Testing. He asked for the co-operation of the association in eliminating fraudulent and dishonest tests. The following resolution was passed: Resolved, that the Southern Tier Veterinary Medical Association severely condemns the practice of fraudulent tuberculin testing and that the association act in conjunction with the state department of agriculture in stamping out the practice. The next meeting will be held at Owego.

C. P. FITCH, *Secretary*.

COMMUNICATIONS

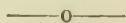
ACROSS A GAP OF 2,000 YEARS.

“Caesarian Section in Boston Bitch” (Am. Vet. Review, June, 1915, XLVII, 355) has an apparent parallel of approximately twenty centuries ago; then the idea of this operation (however called) was more familiar than even today when sundry practitioners consider it safer than “twilight sleep.” Medical Aspects of the Greek Anthology (J. D. Rolleston in *Proceedings, Royal Society of Medicine*, 1913-14, VII, ii, Hist., at p. 55; also in *Janus*, 1914, XIX, at p. 130) has the following (at the end, the contrast being between the goddess of childbirth and the god of the sword and other edged-implements):—

“The following epigram by Philippus (ix, 311) on cicatricial stenosis of the vagina in a bitch obstructing parturition deserves to be quoted:—

A bitch which rivalled swift stags in its course was wounded in the birth passage when pregnant and all the parts as it cicatrised closed up in time, and the hour for delivery arrived. While it was howling terribly, a man cut it with a knife and the dear little pups leapt forth from the womb. There is no need for Artemis to help in delivery since Ares acts as midwife.”

ALFRED ELA, Salem, N. H.



REVIEWS

MEDICAL AND VETERINARY ENTOMOLOGY

A Textbook for Use in Schools and Colleges as well as a Handbook for the Use of Physicians, Veterinarians and Public Health Officers. 8°. 393 pp., 228 figs. By William B. Herms. New York, 1915. The Macmillan Company.

This book constitutes a very valuable reference for persons working along medical lines. It would also serve as an excellent text for a course in medical or veterinary entomology or tropical medicine. For the purposes of the one year course in general parasitology as given in most veterinary colleges at the present time this

book would be of great service as a book of reference, though it is unlikely that the time at present devoted to parasitology or medical zoology in these schools would permit of the use of a book of 393 pages as one of several texts.

The numerous insects which may carry disease mechanically are given ample discussion in the book, and the various parasitic insects, ticks, etc., together with the parasites which some of them may transmit as intermediate hosts, are discussed at length. Aside from the chapters on insects of medical interest and importance, the book gives a general discussion of parasites and an illustrated review of the subject of insect anatomy which will be helpful to the physician or veterinarian who may be confronted at times with papers and discussions which assume too much with reference to his knowledge of this subject. There are some helpful keys; more of these, such as a key to the larval botflies of the horse, could be included in a later edition to advantage.

The Veterinarian will find this book of value. It discusses and figures the insects and related arthropods which may be met with in practice as parasites or otherwise injurious forms, and gives detailed methods for treatment and prophylaxis, and in some instances outlines a program of eradication.

For future editions of this interesting and valuable work—and it is worth mentioning that the book is written in a wholly readable style and amply illustrated—the reviewer would suggest that books on medical entomology might well place more emphasis on what has not yet been recognized in books of that kind as the important role of such non-parasitic forms as the Orthoptera, moths, beetles, earwigs, etc., as intermediate hosts of parasitic worms (nematodes belonging to the Spiruridae, Mermithidae, Gordiidae, etc., and such tapeworms as *Hymenolepis*); that the abbreviation n.g. (new genus) be dropped from keys copied from the publications in which such genera were new; and that more space be given to the vexatious topic of demodectic or follicular mange, its bacterial complications, medicinal and vaccine treatments, etc. The book contains very few misprints, is up to date on the topics treated, and is in all ways a credit to the author and publishers.

M. C. HALL.

LYMPHATIC GLANDS IN MEAT PRODUCING ANIMALS

P. GODBILLE, Section Chief

of the Sanitary Veterinary Inspection of Paris and the Department of Seine.

Translated by ALEXANDER LIAUTARD and D. ARTHUR HUGHES.

New York, W. R. Jenkins Co., 1915. Pp. VIII—175.

The purpose of this little book, as stated in the preface "is to indicate how the organs can be most readily found because of their precise topographic relations."

The book is divided into two parts. Part I consists of 48 pages of text and 34 pages of figures and their explanations. This part is divided into 10 chapters and is devoted to the location of the lymph glands in cattle, (4 chapters); swine, (4 chapters); sheep and horses, (2 chapters).

Part II consists of 44 pages of text and is divided into 6 chapters; 1 The normal appearance of these glands and their products. 2 The white globules or leucocytes. 3 The variations in structure of normal lymphatic glands and the reasons for them. 4 The pathological alterations occurring in lymphatic glands of meat producing animals. 5 The parasitic alterations. 6 The microbial alterations.

The book is completed by an exhaustive index of 11 pages.

Doubtless this little work will prove helpful to many of those for whom it was prepared.

The type is large and clear and the press work is excellent. It is to be regretted that the translators did not conform to the generally accepted modern idea of anatomical nomenclature.

The introduction of such words as sus-sternal, sus-tracheal, sus-epitrochlear, etc, is not to be commended. Some mistakes have been noted in the labeling of a few of the figures. Fig. 3 No. 9 and 13 refer to the same organ. Fig. 5 A the rethopharyngeal lymph gland No. 5 should be at the medial side of the stylohyoid; also No. 7 is not the foramen caecum. In Fig. 11, No. 1, 3 and 8 are incorrect.

The aim of the translators to assist in the diffusion of a more general and exact knowledge of the topography of the lymphatic system is most praiseworthy and most heartily to be commended.

G. S. H.

NECROLOGY

JOHN DESMOND

Veterinary Surgeon John Desmond of Adelaide, South Australia, died November 20, 1915. Dr. Desmond was formerly chief government veterinary surgeon, chief inspector of cattle, and government bacteriologist for South Australia.

MADISON BUNKER

Word has been received of the death of Dr. Madison Bunker, which occurred on January 16. He graduated from the Massachusetts Agricultural College in 1875 and later from the American Veterinary College. He was an ex-president of the Massachusetts veterinary medical association and a past member of the A. V. M. A.

J. F. W.

WALTER G. BOEHME

Dr. Walter G. Boehm died suddenly at his home in Georgetown, Ohio, January 11, 1916. The cause of his death was unknown. He was a graduate of the College of Veterinary Medicine at Columbus, Ohio in the class of 1908, and was a member of the Ohio State Veterinary Medical Association. He was a brother of Edwin Boehme, D.V.M., of Batavia, Ohio.

V. H. CARTER

Dr. Carter of Haskins, Ohio, died January 17, 1916 as the result of an attack of pneumonia. He was a graduate of the Grand Rapids Veterinary College of the class of 1911 and was a member of the Ohio State Veterinary Medical Association. Mrs. Carter is in the hospital with pneumonia and an only child, a small boy, is also in the hospital as the result of a recent operation.

MISCELLANEOUS

Dr. W. J. Cleveland of Rocky Ford, Colorado, has removed to Galt, Iowa to take charge of the Wall Lake Stock Farm.

Dr. L. A. Maze, who has been at Chelsea, Mich. the past four years has accepted a position with Parke, Davis & Co., as assistant veterinarian at their biological farm at Rochester, Mich. Dr. Maze assumed his new duties January 15.

The Pennsylvania State Veterinary Medical Association will hold its annual meeting at Pittsburgh February 22 and 23.

The next meeting of the Alabama Veterinary Medical Association will be held at Auburn, Alabama, February 18 and 19.

A competitive civil service examination will be held on March 15, for the position of veterinarian, Bureau of Animal Industry and Quartermaster Corps.

Dr. Ludwig P. Pine, a veterinarian in New York City, committed suicide by taking ether. Despondency over the death of his wife several months ago is announced as the cause.

W. I. Francisco of Kalamazoo, Mich., has been appointed veterinary inspector and is to be stationed at Sioux City, Ia.

Veterinary Inspector E. K. Ward has moved to Ardmore, Oklahoma, to begin a campaign for the elimination of the cattle tick in Carter county.

Mayor Green of Kansas City, Kansas delivered the address of welcome at the meeting of the Kansas Veterinary Medical Association at that city.

The firm of Miller and Lang was dissolved December 23rd. Dr. E. M. Lang has established a veterinary hospital at 513 E. Market St. Louis, Ky. with indications for a successful practice.

At the December meeting of the California State Veterinary Medical Association at San Francisco, C. L. Roadhouse was elected president; G. J. Donnelly, Vice-President; F. M. Hayes, Secretary, and James Boyd, Treasurer.

A "Dr." C. R. Wildes has finished a rather vivid career by robbing a bank in Chautauqua County, Kansas. He has been placed in charge of the live stock hospital at the state prison.

According to newspaper reports a man in a hospital at Santa Monica, California, is said to be dying from foot-and-mouth disease.

Dr. L. R. Groner, a veterinarian of Bath, Pa., and president of the first national bank is reported critically ill.

The responsibility for the outbreak of the foot-and-mouth disease in Michigan is placed upon the department of Agriculture by State Veterinarian Dunphy, who claims that the report of the secretary is misleading in this respect.

The state veterinarian of North Dakota has issued a warning that parties purchasing stallions should take precautions to determine that the animals are free from transmissible disease and unsoundness and conform to the North Dakota stallion law.

The latest statistics of the U. S. department of agriculture relative to the number of domesticated animals in the United States compared with January 1, 1915, is as follows: In numbers, horses have decreased 29,000; mules increased 86,000; milch cows increased 726,000; other cattle increased 2,386,000; sheep decreased 794,000; swine increased 3,429,000.

In average value per head, horses decreased \$1.73; mules increased \$1.51; milch cows decreased \$1.43; other cattle increased \$0.11; sheep increased \$0.67; swine decreased \$1.47.

In total value, horses decreased \$39,634,000; mules increased \$16,553,000; milch cows increased \$8,781,000; other cattle increased \$83,759,000; sheep increased \$29,661,000; and swine decreased \$65,589,000.

The total value of January 1, 1916, of all animals enumerated above was \$6,002,784,000, as compared with \$5,969,253,000 on January 1, 1915, an increase of \$33,531,000, or 0.6 per cent.

The blue cross society is doing a great work in the European war. Through its good offices much of the pain which the horses suffer on the battle front, from sickness and wounds, is relieved. the society is doing its best to relieve the sufferings of these dumb animals and to check the waste of horse life irrespective of nation.

ality. Contributions are welcome and donations may be sent directly to the Blue Cross Society, 58 Victoria St., London, S. W. England.

The *Breeder's Gazette* believes, after the recent encounter with foot-and-mouth disease, that the time has come when the general standard of the veterinary profession in this country must be marked up. It recommends the establishment, at the Chicago Union Stock Yards, of an institution, under the supervision of the University of Illinois, which shall rise to the full stature of all that a twentieth century veterinary college and experiment station ought to be, and that nothing short of the best of everything in the way of equipment and the best trained men in Europe and America should be employed. Such a project was attempted a number of years ago but failed to materialize.

During the nine months ending January 1 the state veterinarian's department of Nebraska inspected 176,138 head of cattle for scabies. The total number found infected was 28,718. These and 41,982 that had been exposed were dipped. The inspectors found 105,000 head infected. The disease has existed in western Nebraska and other western states for many years and the state with the co-operation of the government is making special efforts to wipe it out.

A chapter of the Omega Tau Sigma fraternity has been installed at the Veterinary College at the George Washington University at Washington, D. C.

Dr. H. T. D. Lackie who has been assisting Dr. F. F. Dolan for the past two years has decided to locate at Arenegard, N. D.

There were thirty-one candidates for veterinary license certificates at the recent examination given by the Minnesota state veterinary medical examining board.

JOURNAL

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

Formerly American Veterinary Review

(Original Official Organ U. S. Vet. Med. Assn.)

PIERRE A. FISH, Editor

ITHACA, N. Y.

Committee on Journal

F. TORRANCE, *Chairman*, A. EICHHORN, *Secretary*, C. J. MARSHALL, W. R. BLAIR, R. A. ARCHIBALD, M. JACOBS, N. S. MAYO, G. R. WHITE, V. A. MOORE, L. FROTHINGHAM, C. H. STANGE, H. JENSEN, G. H. ROBERTS, R. P. LYMAN.

Sub-Committee on Journal

C. J. MARSHALL, *Chairman*, R. P. LYMAN, A. EICHHORN, *Secretary*

The American Veterinary Medical Association is not responsible for views or statements published in the JOURNAL, outside of its own authorized actions.

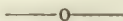
VOL. XLVIII. N. S. VOL. I. MARCH, 1916.

No. 6.

Communications relating to membership and matters pertaining to the American Veterinary Medical Association itself should be addressed to Secretary C. M. Haring, University of California, Berkeley, California. Matters pertaining to the Journal should be sent to Ithaca, N. Y.

A. V. M. A. MEMBERS AND THE JOURNAL

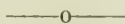
Some of the earlier numbers of the *Journal* have been sent to all of the members of the A. V. M. A. whose names appeared upon the list, although the dues had not been paid in every case. The Post Office Department requires a "legitimate list" of subscribers among the association members, which is interpreted to refer to paid-up subscribers. The subscriptions of members are paid from their dues and in order to fulfill the requirement it will be necessary that the dues should be paid up to date. Therefore, those members still indebted to the association should see to it that their accounts are balanced if they wish to continue to receive the *Journal* as members. The secretary will notify us promptly when the payments are made.



LOCAL COMMITTEE OF ARRANGEMENTS FOR THE DETROIT MEETING

S. Brenton.....121 W. Alexandrine Ave., Detroit, Mich.
Theodore F. Krey, Sec'y.....451 Sheridan Ave., Detroit, Mich.
W. Austin Ewalt.....Mt. Clemens, Mich.

George W. Dunphy.....	Quincy, Mich.
J. J. Joy.....	243 Collingswood Ave., Detroit, Mich.
Joseph Hawkins.....	184 Stanton Ave., Detroit, Mich.
G. D. Gibson.....	Adrian, Mich.
Judson Black.....	Richmond, Mich.
Ward Giltner.....	East Lansing, Mich.

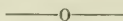


VETERINARY EMBLEM

The chairman of the committee on Emblem of the A. V. M. A. is desirous of obtaining all information and data possible on veterinary emblems used by veterinarians, veterinary societies and veterinary branches of the armies of this and foreign countries.

With the idea of obtaining and compiling as much information as is necessary to bring the matter intelligently before the committee, he is anxious to give an opportunity to all the members of the A. V. M. A. and veterinarians in general, so as to submit such designs as may be suggested for an emblem.

In order that data may be compiled for a report and a definite end reached more quickly, suggestions and communications should be sent to the chairman, O. A. Longley, 616 Eye St., Fresno, Calif.



VETERINARIANS AND ARMY SERVICE

At the February meeting of the Missouri Valley Veterinary Medical Association, Dr. Vans Agnew called attention to the difficulty experienced by the Quartermaster's Department in getting efficient veterinarians for emergency service. Under present conditions the department advertises for veterinarians and frequently has to employ men not very well qualified. It seems self-evident that any plan which will increase the efficiency of the Army Veterinary Service should receive due consideration and that the earlier it is considered, the better. As a National organization the A. V. M. A. may be expected to take some action in the matter. It's next meeting is still some months away, but it is none too early to give the problem consideration and formulate plans for promoting the desired efficiency.

The Missouri Valley organization, with commendable promptitude, appointed a special committee to consider the matter and the following report was adopted;

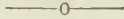
"In view of the difficulties experienced by, and to facilitate the work of the Quartermaster's Department of the United States Army, the Missouri Valley Veterinary Medical Association recommends that the American Veterinary Medical Association prepare, for the use of the Quartermaster General, a list of qualified veterinarians available for army service in case of emergency; such a list to indicate the branch of service for which the veterinarian is best adapted."

Committee:

N. S. MAYO

B. W. MURPHY

J. H. OSTERHAUS



SHOULD OUR SYSTEM OF THERAPEUTICS BE REVISED?

At the risk of being branded as iconoclasts, wise, thinking, practitioners now seldom hesitate to challenge the views about drugs that were forced upon them in the class-room and over which they were compelled to "burn the midnight oil". In fact, wherever the subject of therapeutics is discussed now-a-days among old, experienced, progressive, practitioners the cherished belief they once entertained about the curative properties of drugs is *without exception* is actually ridiculed, and it is extremely doubtful if there could be found in the whole profession a single man who would or could attribute his success to a profound knowledge of orthodox therapeutics. On the contrary, almost everyone unhesitatingly insists that the conventional instruction he received was so erroneous that years elapsed before the truth dawned upon his deluded mind.

It seems that the teaching of therapeutics loses attraction when not metaphorically adorned and that those engaged in that enterprise have been slow to shape their instruction to conform with modern discoveries in medical sciences.

What is wrong with this branch of our science that those who practice it most should respect it least; that few thinking men will follow its consecrated doctrines through life; or even court a closer acquaintance with its dogmas after a few years of experience; that success in practice comes only after its fallacies have been dispelled; and that almost everyone so soon loses faith in its principles? The whole system of therapeutics, that is, the time-honored system ex-

toll'd from the lecture platforms and in our voluminous text-books seems to need revision; or better still it should be eliminated in order that it might be rebuilt of a different fabric and upon an entirely different foundation.

True, the system is slowly undergoing revision but the transformation is too slow and it is unfortunate that the changes come more from the practitioner than from the teacher of therapeutics. Students are still taught that drugs are very effectual weapons against disease. They are taught without equivocation that these weapons may be depended upon to *fight* disease, and from these precepts the impression is invariably gained that such a thing as a mortal termination of a disease must henceforth be a curiosity. It does not matter how much the pathologist, the physiologist and the surgeon preach the gospel of simple therapeutics, or how much modern discoveries expose the fallacies of the system, this branch goes merrily on with dreams that start the student out with an entirely false conception of the healing art.

This is not as it should be at this day and age. Are there not enough truths in this branch of our curriculum to occupy the time of students without burdening them with a misguiding travail that neither disciplines the mind nor respects facts? It seems plain that the unsuspecting student has been misled too long for the good of the cause, that the time is here to speak the plain truth about the actual merit of drugs, that the days of the shot-gun prescription are over and that the medical armament of the day does not contain the best weapons of the physician. In short, the student as he leaves college should already be the skeptic, the agonistic he is sure to become as soon as he begins to think for himself.

The harm arising from this childish faith in our academic therapeutics is by no means imaginary; it is real. The recruit is armed with ordnance the expert has learned is too freakish to comprehend, too unreliable to insure, too intricate to control, and his mind is diverted from such harmless and effective weapons as effectual quarantine, perfect disinfection, scientific ventilation, rational surgery, balanced regimen, bodily comfort, seasonable clothing, comfortable bedding and cheerful surroundings, all of which the present system of therapeutics teaches by inference, are secondary to its medical propaganda.

In spite of years of experimentation, investigation and research uncertain theories predominate over facts, exaggerations overshadow

truths and the best arguments are still drawn from the realm of empiricism. Does not our cherished system of therapeutics need revision?

L. A. M.

"HIGH STANDARDS"

We recently received a bulletin, issued at a veterinary college, containing an article on the above subject with certain paragraphs marked for our benefit. One paragraph states that the country boy is needed in the veterinary profession and that it is well when comparing equivalents to consider "whether the training which a youth receives in his daily farm life is not equal to that of a high school diploma".

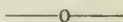
It all depends on whether a veterinary *trade* or a veterinary *profession* is desired. Contact with animals and their surroundings is not a substitute for knowledge. If a boy should be born in a stable he is not necessarily "called" to be a veterinarian, because of the environment of his birth, any more than a boy accidentally born in a church is "called" to be a clergyman. Many of the old-fashioned "horse doctors" were country-born and bred and we have no doubt that a great number of them had an intense love for animals. Is it wise to go back to that standard? There is nothing incompatible between a country boy and a high school diploma or even a university education. Many have acquired both and we believe the number is growing. Is it not stigmatizing the country boy unnecessarily to insinuate that he is incapable of a high school diploma? The country "horse doctor" did not consort to any great extent with other professional men, nor did he always stand high in the respect of the community. Other professions have not accepted vocational experience as a substitute for education. Why should the veterinary if it aims to be on a par with other professions? Of course we need the country boy: we also need the city boy. We need any boy *with brains*.

The final paragraph asks: "Is it better to study Caesar, or milk cows when the veterinary embryo is in the making?" Milking cows does not materially assist a professional man in writing prescriptions, which should involve some knowledge of Latin. Again it seems to us, especially "when the veterinary embryo is in the making", it is better to cultivate brains and that Caesar is quite as good as milking for the purpose.

P. A. F.

DR. C. J. MARSHALL TO GO ON A FOREIGN MISSION

The reports which have been published of the excellent work of the military veterinarians on the western battle front in Europe have induced a friend of the University of Pennsylvania to donate a fund to be used to send a veterinarian to England and France to make observations in the hope that information will be obtained which will be of service in this country. The veterinary corps of the English Army has been especially efficient in caring for horses wounded in battle or exhausted by hardships and it is believed that much can be learned from the experiences of the members of this corps, which will be of value to veterinarians and others. Dr. C. J. Marshall, Professor of Veterinary Medicine in the Veterinary School, has been selected for this important mission and it is expected that he will sail from New York on the steamer Rotterdam on March 7th. He will go first to England where he will study the organization of the veterinary corps of the English Army and the methods in operation in the concentration camps to prepare the horses for service and to protect them from infectious diseases. From England he will go to France where he hopes to have an opportunity to observe the methods of treating wounded and exhausted horses at the front and in the base hospitals. He will also study the measures taken to prevent the introduction of infectious disease and observe the methods used in caring for the horses in the military camps and remount stations.



EUROPEAN CHRONICLES

Bois Jerome.

SUGAR IN SURGERY. In a series of articles published in *La Clinica Veterinaria*, Doctor Girardo Bussano, assistant and lecturer docent in the veterinary high school of Milano, has called attention to the application of sugar in veterinary surgery and sustained his suggestions by the record of quite a number of successful cases where sugar was the essential element of treatment.

Proceeding with an historical part, the author tells of Galen, who recognized the antiputrid property of sugar and had used it for the preservation of cadavers. Continuing by the various applications, which gradually brought it in use in human surgery,

where he found it employed against ulcerations of a serious nature, in hospital gangrene, in wounds with large loss of substance and again in catarrhal ulcers of the mouth and fauces, in chronic catarrhal pharyngitis, laryngitis and tracheitis, or in catarrh of the nose and frontal sinuses. Bussano tells of its properties in cases of intoxication with metallic salts, such as copper, lead, silver, gold or mercury. Its beneficial effects are then demonstrated by the records of experiments, where its antiseptic properties are shown by Fisher, Billroth and others. Kühne, after experimenting with solutions of sugar, for the washing of the abdominal cavity, advocated irrigations of that cavity in the treatment of acute peritonitis and concluded that sugar prevents intestinal putrefaction.

Later on Magnus and others experimented to establish the manner in which the organism would behave in regard to the introduction of solutions of sugar. Such were injected under the skin and into the veins. Experiments were made on animals and one man. The conclusions from the experiments were that sugar offered a means of treatment without presenting danger. Its disinfecting properties, its ready absorption, its deodorizing power and the sound and rapid development that its application promotes in granulating surfaces, all point to its usefulness.

These facts thus reviewed from the literature extending from 1883 to the present time, found their application at the clinics of the Milano school, where numerous trials were made and wonderful results obtained.

The indications where sugar was used varied much. It was used with sutured solutions of continuity, instead of being dressed with antiseptic powder, iodoform, xeroform, or others. Or again in open wounds with loss of substance which were to cicatrize by granulation and which were treated likewise. However, it was in injuries of the foot that sugar was used in the greater number of cases.

The *modus operandi* is very simple and is as follows: with sutured wounds simply the application of the sugar finely powdered, so as to form a kind of crust under which the cicatrization will proceed *without suppuration*.

With open wounds where loss of substance exists or after foot operations, when a part or whole of the wall has been removed, the parts are first thoroughly and minutely washed with sterile water and then a coat of sugar is applied so as to form a rather thick coat upon which should be applied the absorbing and com-

pressing gauze or bandage, supported by the necessary apparatus.

The first dressing can be left 48 hours but the following ones can be left 7, 8 or 9 days and sometimes 10 or 11.

When the dressing is changed the wound looks well, granulating with healthy color, unless the pressure of the dressing has been too great, when the granulations may not have as sound and rosy an aspect but look as if they had been asphyxiated.

What is readily to be observed, in foot injuries, is the rapid formation of the new horn, which in a few days has assumed conditions such that the wearing of a shoe is possible.

As the author remarks, he has had many opportunities to resort to sugar medication and the results he has obtained justified his endorsement of its use.

Out of a large list of cases he has selected and described twenty of various kinds and severity: such as a large gangrenous wound of the middle of the anterior face of the left metatarsal, which is handsomely illustrated, cases of canker of the foot, fibro-sarcomatous growth, complicated punctured wound of the foot with removal of the sole and wall, several lacerated wounds more or less complicated, cartilaginous quitters, injuries with loss of substance of all kinds, fistulous tracts, chronic abscesses, etc., etc.

This valuable subject is then brought to a close by the following general conclusions:

1—Solution of sugar injected subcutaneously, in the abdominal cavity or in the articulations of animals used for experiments, is reabsorbed in a short time and without giving rise to accident except a slight elevation of the temperature which passes off very rapidly.

The same solution, at a higher degree of concentration, 25% and a temperature of 29°–30° C. can be injected into horses, in the trachea, or in the veins (jugular) with the double advantage of being more rapidly absorbed and yet easily tolerated.

From 500 to 1000 c.c. can be injected every day, without giving rise to any disturbance of the organic functions and more than that if the injections are renewed for several days in succession, a noticeable improvement is observed in the general condition of nutrition and on that account the injection can advantageously take the place of the ordinary injection of physiological serum.

The solution can be made with simple distilled water or in physiological serum by the addition of 250 grammes of sugar for 1000 c.c. and thus a solution of 25% can be obtained.

2—Sugar in powder, applied on any kind of wound or solution of continuity, acting by its absorbing and antiseptic properties gives rise at the same time to an hyperactive nutrition and reparative action on the granulating layer of the wound, which in a short time carries it to rapid and solid cicatrization.

3—Sugar, applied directly to a sutured wound, protects it from any possible infection, thus insuring a first intention cicatrization. Applied upon a wound which has not been closed with sutures and where loss of substance exists, no matter what may be its nature or extension, it promotes rapidly the development of granulations of good appearance and accelerates the process of repair.

4—In general, in operations on the foot, accompanied with more or less loss of substance and especially in the partial or total removal of the sole, treatment with sugar, besides quick cleansing of the wound, activates also the rapid formation of the horny tissue, which can be observed a few days after the surgical interference.

5—Sugar possesses besides, the immense advantage of being a strong deodorizing agent, removing the bad odor that impregnates the dressing, especially in cases of canker of the foot where the odor is characteristic and so truly repulsive.

6—With the sugar treatment the formation of pus is not observed, even in large wounds with or without loss of substance. With the sugar on the contrary, it has been observed that the secretions in the wound diminish from the very beginning of the treatment and would disappear almost entirely.

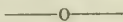
If a dressing with sugar has been properly applied, it can remain undisturbed without any inconvenience for 8 or 10, or even 12 days.

7—Sugar can be used in solution or in its natural state, as it is found in the stores. It needs no special preparation before use. Consequently it is an excellent material, as useful, as practical, not only on account of its low cost but because it can be found anywhere at a moment's notice.

8—As to the therapeutic properties that common sugar possesses the author prefers it to glucose because of its fixed character, its low cost, it is easily pulverized and adheres well to the tissues, forming stronger and more compact layers.

9—By its absorbing, antiseptic and cicatrizing properties, sugar represents a therapeutic agent of the first order, which can

render great service in veterinary surgery, especially in private practice, as a substitute for the common antiseptic powders of today.



CAMPBOR AND TETANUS. That prevention is better than cure, is an old medical saying, which notwithstanding its age and perhaps on its account, is one of necessity at the seat of war.

That tetanus has been relieved and its fearful mortality has been reduced is no doubt due to the extensive use of antitetanic serum injections, whenever these were possible.

But there are circumstances where injections of serum are not possible, when the expected prevention does not take place and it is then that the practitioner thinks of his arsenal of curatives and looks for the ones which are likely to give him the results he desires.

The choice is difficult. Many are the modes of treatment and many the drugs which have been tried. An army veterinary major, Mr. Poret, a great advocate of the preventive qualities of the serum has thought it would be an advantage to find an agent, upon which the practitioner could fall back, as a serious adjunct in the treatment of lockjaw and selecting camphor, he experimented with it. He had a tetanic horse to treat and he injected subcutaneously in this animal 200 grammes of concentrated sterilized camphorated oil, representing 50 grammes a day. In a few days, the disease, which was progressing slowly, improved so much that recovery at short notice, say a few days, was considered imminent.

Was this a simple coincidence, and would the horse have got well without the camphor, was the question?

Fortunately, a second case came. One of lockjaw from a punctured wound of the foot. Serum injections had been given late. The disease had existed three days. Between 200 and 250 grammes of concentrated camphorated oil injected subcutaneously was followed by quick recovery.

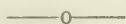
Still another case occurred in an establishment where preventive injections were made quite often, on account of the frequency of lockjaw cases. This case was treated with camphorated ether, 5 c.c. of which were injected into the jugular three times a day. He received also 5 c.c. of oil by subcutaneous injections. Chloral was administered per rectum. The result was slow but recovery followed.

Similar results were again recorded in a colt, whose tail had been amputated and which did not have any preventive injection of serum, also another horse which was treated intravenously.

While Poret treated his patients, he observed that the dose of 20 c.c. was the highest the animal could stand and that only when given gradually. High doses gave rise to manifestations, which subsided rapidly, it is true, but could assume alarming characters.

These experiments, which appear in the *Bulletin de la Societe Centrale* were not offered as complete. The treatment was not presented as one with a specific microbial agent, nor as an antitoxic experimentally tested, it was only a therapeutic initiative which after all may prove its usefulness when it has been tested by others. It certainly deserves it.

In the same *compte rendu* of the *Bulletin*, there is another record, an experiment on two horses affected with acute tetanus, where Mr. Lecuyer injected three times a day, in the jugular, 5 c.c. of camphorated ether and under the skin 45 c.c. of the same oil in 8 or 9 doses. Both horses recovered. Why not try it?



GASEOUS GANGRENE. This important subject has been the occasion for a valuable communication before the French Academy of Medicine at one of its last sessions. It related to work done by Professor Weinberg and Seguin.

From it, it appears that if the *Bacillus perfringens* is the most frequent in gaseous gangrene, there are cases where the principal part is acted by other anaerobies, such as the septic vibrio, the *Bacillus edematicus*, etc. More frequently, the severity of the disease depends on microbial associations, which are different according to the cases. That wounds, complicated with gaseous gangrene, end in death or septicemia, death is always due to an intoxication, which in many cases is the result of the simultaneous action of several toxins secreted by the associated pathogenic microbes.

To these microbial poisons, the authors give the name of *ecnotoxines* which act in common upon the organism and that of *ecnotary* to the general intoxication they give rise to.

Weinberg and Seguin have succeeded in preparing sera against the most important microbes of gaseous gangrene. The anti-perfringens serum, antimicrobial, is useful in the cases where the *B. perfringens* is the principal agent, providing it is used before septicemia is fully developed. Antiseptic vibron and anti-edematous sera are antitoxic.

According to the authors, it is difficult to prepare from one animal a serum that will act against all the toxins.

It is not likely that one antipolytoxic serum can be prepared

against gaseous gangrene, as the number of pathogenic microbes found in that disease becomes increasingly greater.

For the authors, it seems the best means to reduce the number of fatal cases of gaseous gangrene is to treat preventively all wounds with a mixed serum, one made of the active sera which are prepared against the microbes known as the most dangerous in that disease.

A. LIAUTARD.

THE PURCHASE OF ARMY MULES IN U. S. A. "It has been stated officially that the Government have had to spend £12,000,000 in America on horses and mules to meet the vast requirements of our armies abroad. This figure history may show to be under rather than over the mark.

Since mule-breeding is not carried on in the United Kingdom, this indispensable beast of transport had to be purchased abroad; but much money expended in America would have been saved to this country had the horse supply been in a less unsatisfactory state than it was at the time the officers of the Remount Department of the War Office had to secure animals for war service. From one firm in the United States the British Remount Commission, under Major-Gen. Sir Frederick Benson, purchased 120,000 mules and 60,000 horses.

Reference is made to the Guyton and Harrington Mule Company Properties, the head-quarters of which are at Kansas City, Mr. J. D. Guyton being president, Mr. W. R. Harrington vice-president, Mr. J. F. Guyton treasurer, and Mr. W. K. Harrington secretary. The company have 500 buyers in the field, and thus it covers practically every State in the Union. Kansas City ranks second as a railroad center in the United States, having thirty-two distinct railroad lines, while it is famous as a hay market (the most important in the States), for agricultural implements, live stock, meat packing, and grain.*****

Some day it will be possible to tell how shrewd calculation and much forethought on the part of the chief of British Remount Commission in America enabled our Government to deal on such an extraordinary big scale in horseflesh, and how the vast purchases were shipped to Europe and other theatres of war. The Guyton and Harrington Company may well be proud of their achievement."—*The Veterinary Record*.

VACCINATION EXPERIMENTS AGAINST ANTHRAX*

ADOLPH EICHHORN, Washington, D. C.

The disease of anthrax is widely spread throughout the world, and it is being recognized as one of the most destructive scourges of live stock in the United States. In certain sections it is more prevalent than in others, particularly in the southern states, and since no determined effort has been made towards its suppression, it appears to be on the increase, its presence is now being recorded in localities where it has never before been recognized.

As the spores of the causative agent of anthrax retain their virulence and remain lodged in the soil in an active state for many years in the infected localities, it is very difficult to prevent the spread of the infection and the eradication of the disease is thereby rendered a most serious problem.

Various factors have to be considered in the prophylactic control of anthrax, such as the prevention of the continued impregnation of the soil with the virus by the proper disposition of the carcasses dead of the disease, the destruction of the virus contained in the soil by its proper drainage and cultivation, and the prevention of outbreaks through the immunization of the susceptible animals.

In order to attain the greatest success in the control and eradication of the disease it appears that the best results can be accomplished only through proper attention to all of the above factors.

The execution of such measures would require the earnest co-operation of the stock owners, but even then, on account of the peculiar geographical conditions of certain parts of the country the drainage and cultivation of the land would not always be feasible, and our efforts must therefore be directed principally towards the sanitary measures and protective vaccination. The enforcement of proper sanitary police regulations in connection with the control of anthrax no doubt would materially effect a reduction of the disease, but unfortunately it is rather a difficult task to obtain the co-operation of the interested parties.

The proper disposition of the infective material, particularly of the dead carcasses, should be considered of the utmost importance, since such material constitutes the greatest source of danger towards

*Presented at the meeting of the A. V. M. A. Section on Sanitary Science and Police, Oakland, Cal. September, 1915.

the spreading of the disease. Drainage from the soil polluted by carcasses dead of anthrax may carry the infection to distant points and deposit the spores over large areas hitherto uninfected. Buzzards and other birds (Dalrymple), dogs, and even flies may also carry the infection from such sources into uninfected localities. Therefore, in an effort to control the disease, an educational propaganda must be carried out and stringent compulsory measures adopted for the proper disposition of the infective material from the premises where the disease appears among the stock.

PROTECTIVE VACCINATION. A material reduction and checking of the disease may be successfully accomplished by periodical vaccination of all stock in infected localities. This method, even if practiced alone, would have splendid results in minimizing the losses from this disease in anthrax localities. However, such vaccination must be carried out regularly and irrespectively of whether the disease has already appeared on the premises or not.

Fortunately, in anthrax, we have at our command various methods of vaccination which have proved highly efficient in the production of immunity. As a matter of fact, this was one of the first infectious diseases in which protective vaccination was successfully demonstrated, and we are indebted to the great Pasteur for devising the procedure of the vaccination for this disease. Pasteur proved that anthrax bacilli when cultivated at a temperature of from 42 to 43°C. will gradually lose their virulence, and also that when removed from such an attenuating temperature and cultivated under normal incubation temperature will not change their pathogenicity. Thus, cultures attenuated for twenty-four days will be pathogenic for mice but not for guinea pigs and rabbits; whereas, if attenuated for only twelve days at the higher temperature they will be virulent for mice and guinea pigs but not for large rabbits. The attenuated cultures will retain their reduced virulence under ordinary conditions and only in very exceptional instances was any increase of virulence observed. This characteristic of the anthrax bacillus led Pasteur to employ the attenuated forms of the anthrax cultures for vaccination purposes. Accordingly, he prepared a more weakened vaccine from cultures which had been attenuated for twenty-four days (*premier vaccin*) and for a second injection, cultures which had been attenuated only for twelve days (*deuxieme vaccin*). In the epoch-making demonstration at Pouilly le Fort, before a commission appointed by the French government, he suc-

cessfully demonstrated its effectiveness on sheep and cattle. In this instance the vaccinated animals withstood the injection of virulent anthrax bacilli, whereas the controls died. Since that time vaccination against anthrax by the Pasteur method has been very extensively employed throughout the world. Many millions of animals were vaccinated by this method, and the results in general must be considered very favorable.

At the same time, it must be acknowledged that in vaccination by this method it is essential to have a potent vaccine, and one which is properly tested for its pathogenicity. There are disadvantages in this method of vaccination and these must be given due consideration. The unstable keeping quality of the Pasteur vaccine is a very important factor to be considered. Experience in this line proved that Pasteur vaccine may deteriorate within a very short time after its preparation, and this has also been demonstrated during the work of the Bureau of Animal Industry in the control of the manufacture of biological products, when periodical tests were undertaken with the products of the various manufacturers. In repeated instances a vaccine proved inert within three months of its preparation. At other times, again, it remained potent for a period of a year. This no doubt, is due to the method of preserving and handling the product. When exposed to light and warm temperature it deteriorates very rapidly, and when it is considered that the products of manufacturers are being stored under unfavorable conditions in branch houses and also on the shelves in rural drug stores the loss of potency can be readily explained. For this reason it is aimed in the new regulations of the department of agriculture governing the preparation of biological products to reduce the time limit for the use of Pasteur anthrax vaccine to three months from the date of its preparation.

The injection of an inert product into animals would impart to the stock owners and veterinarians who employ the same a false sense of security, and bring this method of vaccination into disrepute. At times, no doubt, great losses have resulted from the application of inert vaccines.

Other disadvantages of the Pasteur method which must be considered are: first, that it requires two handlings of the animals before immunity is established; second, that the losses from vaccinations are not insignificant; third, that its standardization is not carried out very accurately; and fourth, that the administration

of Pasteur vaccine in herds where the disease has already made its appearance is apt to induce the disease through the reduction of the resistance of the animal during the development of immunity in the process of vaccination, and for this latter reason it is best adapted only in herds in which the disease has not yet appeared.

These deficiencies of the method have been recognized by many investigators who have endeavored to devise other methods of vaccination, and particular attention has been directed towards the preparation of a spore vaccine, because of its superior keeping qualities. In Russia at the present time the method of Zenkowsky, and in Hungary, a spore vaccine prepared by Detre, is being successfully employed; although, aside from its keeping qualities, this product has all the other disadvantages of the Pasteur method. Successful vaccination by spore vaccines was also demonstrated by Nitta, in Japan, and others. Other means of vaccination with attenuated living cultures, aggressins, dead bacteria, etc., were tried but proved of no advantage.

Sobernheim established that injections of increasing amounts of virulent virus into immune animals produced a serum which has great protective value against anthrax. Such protective serum may be produced in the various susceptible animals.

PRODUCTION OF SERUM. The animals which are selected for the preparation of serum are subjected to a preliminary treatment either by sero-vaccination or by Pasteur's method, then at certain regular intervals they are infected with increasing doses of virulent anthrax cultures. For this purpose they receive about ten to fourteen days following the preliminary treatment an injection of from 1/200 to 1/1000 of a loopful of virulent culture. In sheep it is advisable to exercise greater care, especially at the first injection of virulent material, when a very small quantity of the culture should be employed, whereas in cattle and horses it is not necessary to employ less than 1/200 of a loopful. The first injection of virulent culture is usually followed by a considerable reaction inasmuch as the animals usually develop a febrile condition which persists for several days. The subsequent inoculations are then carried out at intervals from two to three weeks in such a way that the dose is soon increased to a loopful, then to several loopfuls and then gradually to several agar cultures, and finally to an injection consisting of several large mass cultures. This is quite easily accomplished in cattle and horses and in three to four months the animals may be

come so tolerant to this injection that they will withstand the subcutaneous inoculations of two to three mass cultures without noteworthy reaction. At times considerably extensive local infiltration may follow the injection which, however, retrogresses within a short time and the general condition of the animals is only slightly influenced. In sheep the immunization causes greater difficulties on account of a greater susceptibility of these animals and it is difficult to prevent a very small percentage of the animals which are being used for serum production from dying in the course of the hyperimmunization. Nevertheless, it is possible even in sheep to produce such an immunity that they will withstand the injection of several mass cultures without reacting.

The more virulent the strain of the anthrax culture which has been used for the treatment of the animals the more care must be exercised in the course of the hyperimmunization, but in that case the anthrax serum would also be more potent. Therefore, it is advisable to use anthrax strains which have been obtained more recently from fatal infections. It is also advisable to use strains of different origin for the immunization. It is immaterial whether bouillon cultures are used or suspensions from agar cultures, but it is more practical to use the latter method for the inoculating material, since in this instance the quantity of fluid to be injected may be limited to a relatively small amount. Quantities of 500 to 1000 c.c. of the bouillon cultures cause, as can be readily seen, considerable technical difficulty for injection, whereas the suspensions from four or five mass cultures may be readily distributed in 50 to 60 c.c. of fluid. Fresh cultures which have been cultivated for about twenty-four hours at 37° are as a rule more suitable for inoculation, whereas older cultures with pronounced spore formations possess no advantages over the young cultures.

The inoculations should be made subcutaneously. Intravenous injections as first employed by Selavo are less effective. The potency of the anthrax serum is in no way increased by this method of immunization. Besides, there exists the danger of emboli, when in the later stages of the immunization process larger amounts of culture material have to be administered. Animals which have been treated with subcutaneous injections will produce finally an anthrax serum of remarkably high potency.

As a rule, the animals which have received one to two agar cultures show a specific protective action of their serum, but for prac-

tical purposes it is not advisable to use the serum at such a period. As a rule only when the animals stand one-half to one-mass cultures is the potency of the serum sufficiently strong. A similar condition is manifested in animals used for the production of immune sera for other diseases, the individuals showing a varying response to the injection for the production of immune bodies: i.e., an animal will at times produce a potent serum relatively early, whereas another with the same method of treatment will develop a serum of the same potency only after a considerably longer preparatory treatment. Accordingly, from observation it has been noted that sheep produce the most potent serum, and in this species of animals the individual differences are of almost no consequence so that almost every animal produces a good anthrax serum. Horses produce also a potent serum, but in this species single individuals may show great variations. The anthrax serum from cattle is quite potent, but in its protective value it does not equal horse and sheep serum.

It is best to draw the blood fourteen to sixteen days after the last injection. An earlier bleeding should be avoided. Not infrequently it occurs that animals after an apparent recovery following the inoculation reaction and after a period in which they are free of fever on the eighth or ninth day suddenly develop a rise in temperature. This has been established by Selavo and Burow. Then again, repeated regular blood examinations showed that at this time and even later, up to the tenth and eleventh days following inoculation, occasional anthrax bacilli may appear in the blood of the animals in greater numbers. The bleeding is carried out in the ordinary way and the blood is collected in large sterilized glass cylinders or similar receptacles of about two or three liters capacity. Seven or eight liters of blood may be drawn from cattle, horses about the same quantity, and sheep about one and one-half liters. After two or three days another bleeding is made. In this instance, however, only a small quantity of blood should be drawn. The animals resist these operations very readily, and after a lapse of fourteen days they are ready for another injection, which is then followed in from fourteen to sixteen days by repeated bleedings. Thus, in the period of a year the same animals may be bled ten to eleven times, and such animals can be used in this way for several years, alternating the injections with the bleedings, provided they are kept in a well-nourished and healthy condition.

In order to obtain the largest possible yield of serum from the

blood drawn into the glass cylinders a weight is attached to the same and released on the clotted blood in about twelve hours after being drawn. The diameter of the weight is about half an inch less than the cylinder and its weight is about two pounds. In about twenty-four hours the clear serum is then siphoned into sterile bottles and preserved with 0.5 per cent of carbolic acid. If proper precautions have been practiced it is not necessary to pass the serum through Berkfeld filters; however, if there is the slightest doubt as to its sterility, it is advisable to filter the serum before bottling. It is advisable to distribute the serum in various-sized brown bottles, which should be securely corked and paraffined.

STANDARDIZATION OF THE SERUM. The testing of the serum must be carried out primarily to determine its potency. It is to be regretted that for this purpose there are no accurate or definite methods known, as it is almost impossible to establish the absolute protective value of the serum, because the animals on which the serum is being tested are so very highly susceptible to the disease. Nevertheless, it is possible to establish a relative value for all practical purposes through laboratory experiments, and some of the investigators believe that rabbits are best adapted for the purpose. The standardization test as recommended by Sobernheim is still employed by various investigators for the determination of the protective value of anthrax serum. This test is carried out as follows:

POTENCY TEST

Rabbit	A—2	ccm. immune serum	intravenous	Follow immediately by a subcutaneous injection of 1/1000
"	B—3	" "	" "	loopful of a suspension of virulent anthrax bacilli in 1 cc.
"	C—4	" "	" "	of 0.7 per cent sodium chloride solution.
"	D—5	" "	" "	
"	E—6	" "	" "	
"	F—(Control animal)	1/1000 loopful of a suspension of virulent anthrax bacilli in 1 cc. of 0.7 per cent sodium chloride solution.		
"	G—(Control animal)			

According to extensive experience, a serum is considered potent and satisfactory for immunization purposes, when, of the five rabbits given the serum at least two remain alive and the others die only later than the control animals. Should more than the two animals remain alive, or even all five, whereas the control animals die in about forty-eight hours, the serum has an extraordinary potency.

It should be noted that it does not follow that those rabbits which receive the smallest serum dose should die, since not infrequently they may remain alive whereas the rabbits receiving larger doses succumb.

This method of standardization has not proven as accurate and reliable as the test recommended by Ascoli, and which has been employed in the experimental work with serum prepared in connection with our experiments.

In this test a twenty-four hour old attenuated bouillon culture is used which is of such a virulence that when introduced subcutaneously in a 0.25 cc. dose into 350-gram guinea pigs it will kill them in from two to three days. These test cultures must be previously standardized in such a way that they will kill guinea pigs which have been twenty-four hours previously injected intraperitoneally with 2 cc. of normal serum. Guinea pigs treated in the same manner and with the same dose of titrated standardized immune blood serum must remain alive.

The testing of the serum is carried out on six guinea pigs, each receiving intraperitoneally 2 cc. of the serum to be tested, and twenty-four hours later the established dose of the test culture is injected subcutaneously in the axillary region. The serum is considered satisfactory for immunization purposes if at least four of the guinea pigs remain alive over six days, whereas the control animals die within three or four days. For protective and curative purposes in man, only such serum should be selected which, by carrying out the same conditions of the test, protect the guinea pig in 0.5 to 1 cc. doses.

EXPERIMENTAL DATA. On September 8, 1914, two horses, Nos. 48 and 96, were vaccinated against anthrax according to Pasteur's method. On September 29 these two horses were given approximately 1-100 of a loopful of virulent anthrax bacilli subcutaneously. Horse No. 48 showed no apparent reaction following the injection. Horse No. 96, however developed local anthrax at the point of inoculation. The swelling became enlarged and there was a considerable area of edema below the same. This condition persisted for approximately a week, and finally disappeared. The animal, however, showed no appreciable rise in temperature during this period.

The following chart gives in detail the process of hyperimmunization:

HYPERIMMUNIZATION

Date	Amount of Virus given each horse	Results
9-29-14	1/100 loopful	No apparent reaction in horse 48. Horse 96 developed anthrax at point of inoculation; large swelling; edema of neighboring tissue. Persisted about one week.
10-24-14	1 loopful	No noticeable reaction in either animal.
11-15-14	10 loopfuls	Ditto
12- 9-14	5 cc. of an emul. repre. ½ growth of agar culture	Horse 48 showed temperature of 102.2° the following day; horse 96, 101°. Both animals developed small, hard nodules at point of injection.
12-29-14	20 cc. of emulsion repre. washing of growth from two agar cultures	Both animals developed small abscess at point of inoculation; soon recovered from same.
1-19-15	30 cc. of emulsion; growth from eight agar cultures	No reaction.
2- 6-15	40 cc. of emulsion; growth from two mass cults. from flasks, surf. area 6x2½ inches.	Slight reaction in horse 96. Horse 48 showed quite an intensive reaction, developing a large swelling at point of inoculation; persisted several days.
3- 5-15	50 cc. of emulsion; growth from four mass cultures from flasks, surf. area 6x2½ inches	No apparent reaction.
3-31-15	50 cc. of emulsion; growth from eight mass cultures from flasks, surf. area 6x2½ inches	Slight local reaction in each case.
4-19-15	Ditto	Slight local reaction in each case.
4-28-15	"	Slight rise in temperature in both cases.
5-11-15	"	Slight rise in temperature and local reac.
5-24-15	"	Slight rise in temperature and local reac.
6-12-15	"	Slight local reaction.

In the above work four strains of anthrax bacillus were used—known to us as "Davis", "6071", "Burt", and "Boener"—the first two strains being highly virulent types, and the latter two very much weaker.

In all cases where the larger amounts of anthrax virus were given the injections were made at four to six different points to minimize abscess formation.

It might be well also to state here that the irregularity in the time between injections was due to the fact that this work was interfered with by the outbreak of foot-and-mouth disease in this

country, and for this reason it was also impossible to subject the blood to periodical tests, in order to ascertain its immunizing value at the different intervals between injections. Experience proved that horses may produce highly potent serum following the injection of the first or second mass cultures. It is therefore advisable to subject the blood of the animals to periodical tests for potency throughout the course of immunization.

On June 25, 1915, six liters of blood were drawn from each horse into the glass bleeding cylinders previously described. Since this date these animals have been bled regularly, taking six liters of blood from each horse, giving an injection of virus in the intervals between bleedings.

In standardizing our serum, that taken from each horse was tested separately. The following procedure was carried out: Three series of guinea pigs were inoculated intraperitoneally with varying amounts of serum, and 48 hours later were injected with 0.25 cc. of a 24-hour bouillon subculture of an attenuated strain known as "Davis D". This culture had been attenuated by growing it at a temperature of 42-43°C. for a period of twenty days. Previous tests of this culture showed that it was uniformly pathogenic for guinea pigs, killing them in two to three days, but failed to kill rabbits. The results of this test are contained in the following table:

SERUM No. 48

Serum injected intraperitoneally; virus 24 hours later subcutaneously.

Guinea pig No.	Amt. of serum	Amt. of Virus	Results
1	1.- c.c.	$\frac{1}{4}$ c.c.	Remained alive
2	1.5 c.c.	$\frac{1}{4}$ c.c.	Died on third day
3	2.- c.c.	$\frac{1}{4}$ c.c.	Remained alive
4	2.5 c.c.	$\frac{1}{4}$ c.c.	Remained alive
5	3.- c.c.	$\frac{1}{4}$ c.c.	Remained alive
6	3.5 c.c.	$\frac{1}{4}$ c.c.	Remained alive

SERUM No. 96

Serum injected intraperitoneally; virus 24 hours later subcutaneously.

Guinea pig No.	Amt. of serum	Amt. of Virus	Results
1	1.- c.c.	$\frac{1}{4}$ c.c.	Remained alive
2	1.5 c.c.	$\frac{1}{4}$ c.c.	Remained alive
3	2.- c.c.	$\frac{1}{4}$ c.c.	Died on third day
4	2.5 c.c.	$\frac{1}{4}$ c.c.	Remained alive
5	3.- c.c.	$\frac{1}{4}$ c.c.	Remained alive
6	3.5 c.c.	$\frac{1}{4}$ c.c.	Remained alive

NORMAL HORSE SERUM

Serum injected intraperitoneally; virus 24 hours later subcutaneously.

Guinea pig No.	Amt. of serum	Amt. of Virus	Results
1	1.- c.c.	$\frac{1}{4}$ c.c.	Died on fourth day
2	1.5 c.c.	$\frac{1}{4}$ c.c.	Died on third day
3	2.- c.c.	$\frac{1}{4}$ c.c.	Died on fourth day
4	2.5 c.c.	$\frac{1}{4}$ c.c.	Remained alive
5	3.- c.c.	$\frac{1}{4}$ c.c.	Died on fourth day
6	3.5 c.c.	$\frac{1}{4}$ c.c.	Died on third day

In view of these results it was decided to use the "Davis D" culture in the preparation of our spore vaccine, to be used simultaneously with the serum.

Extensive tests to determine whether or not the immune sera possessed a bactericidal property, proved negative.

PREPARATION OF SPORE VACCINE. The four cultures used for the hyperimmunization of the horses were attenuated at a temperature of 42.5°C. for varying periods. From time to time they were tested for their pathogenicity by inoculation into mice, guinea pigs, and rabbits. The cultures removed from the incubator after twenty days of attenuation proved satisfactory for our purpose, inasmuch as the test inoculation demonstrated their virulence for the mice and guinea pigs but not for rabbits.

For the purpose of producing a spore vaccine it is desirable to use a peptone-free agar media, and after inoculation with the attenuated culture to grow the organism at a temperature of 37.5°C. for four to seven days by which time an abundance of spores will have formed.

The growth is then washed from the slants and collected in a sterile flask and heated to a temperature of 60°C. for one-half hour to destroy the vegetative forms of the organism. A measured quantity of this suspension can then be plated out in the usual manner and the spore content of 1 c.c. of the suspension established. A dilution can then be made to the desired amount for inoculation purposes. Thus, if it is desired to use for vaccination 1,000,000 spores, it is best to dilute the vaccine to a quantity of which 1 c.c. would contain this number. Of such vaccine, 1 c.c. would constitute the dose for cattle and horses, with corresponding smaller doses for calves and sheep.

In all forms of vaccination against anthrax in sheep, the greatest care must be exercised, since these animals are very susceptible to the disease and at times vaccines which have no ill effects on cattle will prove fatal to sheep. Therefore the dose of the spore vaccine for sheep should not be more than one-fourth the amount given cattle.

In the preparation of spore vaccines it is essential to submit every lot to a test for pathogenicity by inoculating approximately one-quarter of a million spores, that is, $\frac{1}{4}$ c.c. of the standard suspension into guinea pigs and rabbits, before employing the same for vaccination purposes. The guinea pigs should die in from two to five days, whereas the rabbits should remain alive.

In consideration of the keeping qualities of the spore vaccine, large lots can be prepared without fear of deterioration. In the bottling and storing of the same, proper care should be taken to prevent contamination.

TECHNIC OF ADMINISTRATION. For immunization purposes by the simultaneous method the serum should be injected first. It is desirable to divide the herd into groups of ten or twelve and inject first each animal of the group with the serum, following this with the injection of the spore vaccine. The serum should be injected on one side, either on the neck or back of the shoulder, and the spore vaccine on the other side; the injections being made subcutaneously.

In herds where the disease has already made its appearance, it is necessary to take temperature measurements in all animals and subject to the simultaneous vaccination only those which show no rise in temperature. All others should be given the serum alone treatment, in doses varying in accordance with the severity of the symptoms manifested by the individual animals. If the examination reveals a considerable number of infections it is advisable to use the serum alone in all animals, and in three or four weeks re-vaccinate by the simultaneous method.

The dosage should depend on the potency of the serum, serum of a high potency, naturally, being most desirable; thus in some instances serum in 5 c.c. doses for large animals and 3 c.c. for smaller animals, was found to be effective for immunization purposes. Unfortunately all hyperimmune animals do not yield serum of such high potency and for this reason it is obvious that accurate potency tests should be carried out by the producer of the serum.

In the treatment of anthrax, serum should be administered in large doses. An animal showing only a high temperature with no other manifestation of the disease, should be given from 30 to 50 c.c. but if the gravity of the disease is pronounced, 100 c.c. should be administered. In almost every instance a drop in temperature may be observed and a diminishing of the severity of the symptoms. At times, however, a relapse occurs about the second or third day following the serum injection, when it becomes necessary to administer another dose of serum. It has been proven that animals affected with anthrax, even after the bacilli are found in the blood circulation, may recover after an injection of potent serum.

The simultaneous treatment, as in the Pasteur treatment, may at times result in a temperature and systemic reaction in the animals. These manifestations are indicated by elevation of the temperature and sometimes a swelling at the point of inoculation of the spore vaccine. These symptoms, however, are usually of short duration and only in very exceptional cases will they result in the loss of the animal. However, if the reaction following the injection of the spore vaccine threatens the life of the animal, a second injection of serum should be administered.

The anthrax serum injected simultaneously with the vaccine has a counteracting effect upon the reaction which may follow the injection of the spore vaccine during the process of immunization.

At times anaphylactic reactions are observed as a result of the serum injected, especially in cases where the serum is foreign to the animals treated. These manifestations appear as a rule within one-half hour after injection, in the form of urticaria-like eruptions, swelling of the head, slight chills, and rise in temperature. More severe symptoms have also been noted to follow such injections, but almost invariably subside within a few hours.

A series of experiments was conducted at the Bureau experiment station at Bethesda, Maryland, to establish the efficiency of the simultaneous method of anthrax immunization on cattle and sheep.

For this purpose six head of cattle and five sheep were given the simultaneous injection of anthrax serum and spore vaccine. Three weeks subsequent to immunization they were subjected to infection tests which consisted of a subcutaneous administration of 1½-cc. for the cattle and 1/8-cc. for the sheep, of blood from a guinea pig which died from an artificial infection with our most virulent strain of anthrax.

The microscopic examination of the blood of the guinea pig showed it to be heavily charged with anthrax bacilli, but in order to make the test as severe as possible, it was deemed advisable to use such excessive amounts. Three additional cattle and two sheep were used as checks, receiving only the virulent blood. As a result of this infection all animals manifested an elevation of temperature ranging from 103°-107° F. The control animals especially are markedly affected with typical manifestations of anthrax and all succumbed within two to eight days following infection. All but one of the vaccinated sheep succumbed to anthrax, but at a later date than the check animals. Of the immunized cattle a marked temperature reaction was noted, but all of these animals with the exception of a small, undersized, weak calf which died in six days following infection.

While in the above test the sheep succumbed and one of the small calves died of anthrax, nevertheless, the potency of the serum was demonstrated. The excessive virulent blood used for the infection was extraordinary and could not be compared with the amount of virus taken by a susceptible animal in cases of natural infection.

FIELD TESTS. On June 21, 1915, Doctor Ashworth, a Dairy Inspector for the District of Columbia, notified our office that a number of deaths among hogs were occurring on a farm in Maryland just outside of the District. The symptoms described by Dr. Ashworth pointed suspiciously to anthrax.

A visit was made to the Maryland farm the same morning, and after an autopsy on several animals followed by a bacteriological examination, a definite diagnosis of anthrax was established. This was later proven conclusively by animal inoculation tests.

To date, seven shoats and four sows had died of the disease, and three shoats, four sows, and one boar were showing symptoms of anthrax, several of the sick animals manifesting the characteristic edema of the throat region. (It is desired to make particular mention of the boar, a fine pure-bred animal, which was in almost comatose condition, showing a profuse bloody diarrhea, and a temperature of 106° F. One of the six sows was also in a very critical condition.)

On the afternoon of June 21, the affected animals were given injections of the immune serum, the boar receiving 100 cc., the sows 50 cc. and the shoats 30 cc. On the following day a visit was made to the farm to immunize the remaining hogs which as yet had shown no symptoms of the disease. A total of 138 were given protective doses of the serum, the large hogs weighing 75 lbs. or over receiving 10 c.c., and the smaller animals 5 c.c.

Marked improvement was noted in the sick animals that had been treated the day before.

On June 23, another visit was made to the farm. All of the sick animals showed still further improvement. The boar was given 60 c.c. more of immune serum and the sow that had been the sickest was given an additional 30 c.c.

The result of this work was that every affected animal recovered, and up to the present time not a single death from anthrax has been reported in those animals that received protective doses of the serum.

In the fore part of July an outbreak of anthrax was reported from Queen Anne County, Maryland. On July 13 two inspectors from the Bureau were detailed to make an investigation with a view to using our immune serum and spore vaccine in an effort to control the outbreak.

The disease had made its first appearance about one month previous to this time, when a farmer lost a cow from anthrax. A few days later a neighbor on an adjoining farm lost a hog from the disease. Following this, the disease made its appearance on five other farms in the immediate vicinity, the greater percentage of animals stricken, dying of the apoplectic form of the malady.

Animals on some of the farms had been treated with single injections of a commercial vaccine, before the arrival of our inspectors.

Immunization tests were at once started with the Bureau serum and spore vaccine. The results follow:

The animals on six farms where losses had occurred from anthrax were vaccinated; the cattle, horses, and mules receiving 10 c.c. each of serum and 1 c.c. of spore vaccine, except, however, in cases where there was reason to believe an animal might be in the incubative stage of the disease, when the vaccine was omitted and the dose of serum increased. Sheep and hogs on the infected farms were given the serum alone treatment, receiving from 5-10 c.c. each.

The day subsequent to vaccination a mule on one of the farms showed symptoms of anthrax—there was an elevation of temperature and a characteristic swelling on one side of the neck (the side opposite to where vaccine had been injected). This animal was given an injection of 60 c.c. of serum and made a speedy recovery.

In all 399 animals, including horses, mules, cattle, sheep and hogs on farms where the disease had broken out, were treated with the Bureau serum and vaccine. Previous to this an aggregate of 10 cattle, 3 mules and 13 hogs had died of anthrax on these farms. On the morning of the day following vaccination a cow on one of the farms died of anthrax. But exclusive of this, no losses from anthrax have occurred on any of these farms.

Approximately 140 animals on several other infected farms were vaccinated by a representative of the State Live Stock Sanitary Board with a commercial vaccine. Within a day or two following this vaccination three cows and one mule died of anthrax and since then two more cows have died of the disease.

Another opportunity was afforded us to test our serum and vaccine in an outbreak of anthrax in Noxubee County Mississippi, where a number of farms were reported infected with the disease.

A quantity of serum and spore vaccine was furnished, and an inspector detailed from the Bureau Station at Birmingham, Alabama, to conduct the work.

On various farms where the disease had made its appearance, a total of 125 cattle were given the simultaneous treatment against anthrax. Besides three animals which showed symptoms of the disease were given 30 c.c. of serum alone. No deaths from anthrax occurred immediately following or since the vaccination, the affected animals having all recovered from the disease.

USE OF ANTHRAX SERUM IN TREATMENT OF ANTHRAX IN MAN. Extensive data are available on the effectiveness of anthrax serum on the treatment of the disease in man. It is recommended that from 30 to 40 c.c. of serum be injected in three or four different places. Should no improvement follow in 24 hours an addition of from 20 to 30 c.c. of serum should be administered.

In most instances the results are very favorable and this treatment is acknowledged to be superior to any mode of treatment known for this disease.

CONCENTRATION OF SERUM. Experiments are now being conducted with the drying of the immune serum with a view to preparing the same in pellet form. For this purpose the serum has been dried in shallow pans in a serum drying apparatus. After thorough drying it is scraped from the pans, milled into a fine powder, and prepared in a pellet machine into proper-sized pellets. The same procedure is also being employed with the spore vaccine. This procedure would greatly simplify the administration of the serum and vaccine and besides the products would be in a form less apt to deteriorate or become contaminated.

Through fractional saturation of the serum with ammonium sulphate the proteids containing the protective bodies of the serum were successfully precipitated and further work along this line is now being conducted. However, this work and the work on the drying and concentration of the products are still in the experimental stage and it is our aim to properly work out a method most suitable for immunization of animals in the field.

CONCLUSIONS

1. Horses are suitable for the production of highly potent anthrax serum. Serum of such horses should protect large animals in 10 c.c. doses.

2. The use of the serum alone treatment is indicated in cases where the infection has already occurred in a herd. Since the serum confers only a passive immunity it is advisable to revaccinate the herd in from three to five weeks by the simultaneous method.

3. The serum possesses great curative value. Depending on the severity of the infection, the curative dose is from 30 to 100 c.c.; the injection to be repeated if necessary.

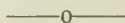
4. For the simultaneous treatment, a spore vaccine carefully standardized, is preferable to the ordinary Pasteur vaccine.

5. Spore vaccine should be employed in preference to the Pas-

teur vaccines for immunization with vaccine alone. The possibility of more accurate dosing of the spore vaccine and the better keeping qualities of the same, gives this product a decided advantage over the other.

6. Experiments with concentrated serum and dry spore vaccine are very promising. This method would greatly simplify the vaccination process and also insure the product against subsequent contamination and deterioration.

I was ably assisted in the technical part of this work by Doctor Raymond A. Kelser, Assistant in Pathology and Bacteriology, to whom credit is due for the painstaking and careful execution of the details of the experiments.



ABSTRACT OF DISCUSSION.

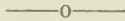
DR. KINSLEY: I think Dr. Eichhorn and the department should be congratulated upon the nearness of the completion of this method for vaccination against anthrax. It appears to be superior to any that we have had before. I also note that it should be used within three months after the date of preparation. If the government can assume and enforce such supervision over our present anthrax vaccine it will certainly be beneficial to those people who live in the anthrax regions. I had an opportunity last summer of studying anthrax in Texas. We found anthrax vaccine in the country drug stores which had been there something over a year. It was cloudy and unfit for use. The state at that time had, I believe, no supervision over the distribution of anthrax vaccine, and I do not recall just what supervision the department had over it, but I do know that in the state there were apparently several centers of anthrax which was the result of the improper use of vaccine, or the use of improper vaccine.

DR. WINTRINGHAM: I would like to ask Dr. Eichhorn to clear up some doubts in my mind regarding the use of the old Pasteur vaccine. I believe we should not vaccinate cattle in that territory where no outbreak of anthrax has occurred, or where the herd has not been threatened, because I believe that such vaccination will possibly contaminate that range. I would like to know if this is possible.

DR. EICHHORN: From my experience, it is advisable to periodically vaccinate, and systematically, all cattle in the anthrax region, and only through such efforts will it be possible to control the disease and protect the masses from anthrax, because if you wait until the disease appears on the premises, it is usually too late and losses cannot be avoided. By the systematic use of vaccine, the losses can be avoided or at least reduced.

DR. GERALD: I have had considerable experience with anthrax. I believe I can answer Dr. Wintringham's question by stating my own experience. This year I have vaccinated something like 10,000 head. I vaccinated 6,000 head on the range where there had never been any anthrax, and on this range we lost two head out of 6,000, using a commercial vaccine.

DR. MAYO: The necessity for anthrax vaccine was forcibly impressed on me in Cuba where it was a common disease, and causes more loss particularly on the sugar plantations after the grinding season begins. The cane is practically all hauled by ox carts, often several yoke of cattle being attached to a cart. It is usually the dry season. The infected animal passed the organisms with the excrement. The drivers use ox geads, and as soon as an ox becomes sick, they prod him along, and also prod others, and it is very readily disseminated, apparently from the inhalation of dust. This is purely theoretical. By calling the attention of the plantation owners to the importance of vaccinating all the working cattle before the beginning of the grinding season, the mortality was reduced to a comparatively small amount.



COCCIDIOSIS IN CATTLE AND CARABAOS IN THE PHILIPPINE ISLANDS AND ITS RELATION TO RINDERPEST*

C. H. SCHULTZ, Seattle, Wash.

Severe outbreaks of Rinderpest occur every few years in different provinces of the Philippines, in spite of all the preventive measures that have from time to time been enforced. During my stay in the Islands I was veterinarian on the staff of the Insular Bureau of Agriculture in Manila, first as assistant in the laboratory for veterinary research at Alabang, Rizal, near Manila; later, in charge of infected Rinderpest territory; and finally, from February until October, 1914, conducting experiments relating to the cultivation of Rinderpest-virus at the Bureau of Science in Manila.

These different assignments provided unusually favorable opportunities for scientific study of Rinderpest, as produced by inoculation of experimental animals and at immunization stations, as well as in outbreaks in the field. Rinderpest in experimental animals was usually produced by subcutaneous inoculation of a greater or

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less quantity of virulent blood in sterile potassium citrate or normal salt solution. The blood was obtained from animals (cattle or carabaos) that were in the early febrile stage of the disease. It is well known that experimental animals show a marked variation of susceptibility to the contagion. (Rodgers¹ 1901; Wooley² 1906; Ruediger³ 1909.)

The symptoms of developed cases of the disease are quite constant and reports of many observers in many countries correspond reasonably well. The description given by Wooley² is very clear and comprehensive. Maherley's⁴ articles although written in 1897 furnish one of the best descriptions written in English and cover all phases of the subject. Hutyra and Marek's Text Book⁵ also contains an exceedingly well written article on Rinderpest.

During the first days of the febrile period, the animals often show marked constipation, feces are passed scantily, formed into hard, dry masses or balls, covered with a distinct layer of mucus, often, but not always, streaked with blood. Animals that die during the first few days show no diarrhea.

In the large majority of cases, certainly in all that live more than six days, this period of constipation is followed by the more or less severe diarrhea and dysentery. When diarrhea begins, thick flakes of mucus pass out, the odor is not particularly offensive and color is nearly normal. As soon as the secretory glands of the intestinal tract become seriously involved, the discharges change from slimy to watery, and are peculiarly grayish and offensive. In robust, well fed animals, before the bowels are exhausted, great masses of mucus, formed into large croupous, gelatinous membranes are passed. At times these are pale yellowish, transparent; they are readily picked up and can be rinsed in water and small selected particles examined under the microscope. These will be found to be teeming with agammonous division forms of coccidia. In the early stages of severe acute attacks, great numbers of sporozoites may readily be distinguished. I have found these protozoan parasites in immense numbers in the discharges of all cases of so-called Rinderpest which I have examined, in the Philippines, in several places in China and in chronic carriers in Japan. The severe type of diarrhea soon causes great weakness and emaciation; mucus appears in small flakes or irregularly formed particles only, shreds of tissue are passed, discharge becomes grayish and always, in severe cases, offensive. In chronic cases it is never sanguinous.

while in acute and moderately acute cases it may be tinged by blood or blood-clots may be expelled. Careful investigation usually shows that these clots are composed of masses of mucus, stained by blood escaping from the injured mucosa. Hutyra and Marek⁵ give a good description of them.

The only cases of Rinderpest where I have not been able to demonstrate coccidia in great numbers, were a few peracute cases, in which no lesions were found in the fourth stomach, but where the entire mucosa of large parts of the small intestines had separated from its basement membranes, was loaded up with blood coagula and ingesta, forming long cylinders, corresponding to the lumen of the bowel. Other animals in the group, that lived longer, invariably showed the familiar forms of coccidia. It is difficult to distinguish the smallest forms in certain stages of development and when agammonous division of schizonts is very rapid their outline is indistinct. Such cases were found among carabaos that had been immunized by the simultaneous method about eight months before and were used as work animals on Rinderpest infected fields and pastures of the Calamba Sugar Estate, 50 km. south of Manila, Luzon, P. I., during the summer of 1914.

History, as well as early symptoms of these animals, would indicate beyond a doubt, so-called Rinderpest; temperature and behavior were characteristic and corresponded to the rapid propagation of the virus in the blood. Hutyra and Marek⁵ say that the early symptoms are due to this cause. A few of the carabaos died before diarrhea set in and feces were found formed into hard round masses covered with blood, in the colon and rectum.

During experiments which I was called upon to execute at the Pandacan Quarantine Station in Manila, four animals were inoculated with very small quantities of virulent Rinderpest blood to determine the least amount that would transmit the disease.

The virulent Rinderpest blood was taken from a case of inoculation Rinderpest No. 3690, on the fifth day after it had received 10 cm. of citrated Rinderpest blood subcutaneously. When the blood was obtained from No. 3690, the animal was drowsy, ears hanging down, eating very little, slight discharge from nose appeared, morning temperature 40° C., evening temperature 41° C. Subsequently it passed through a very severe characteristic attack of so-called Rinderpest.

The experiments were begun on February 22, 1914, in sheds reserved for this purpose at the Pandacan Quarantine Station.

1st: A susceptible strong Dalupiri bull contracted the disease when injected with 1/100 ccm. of virulent Rinderpest blood (diluted). Discharge from eyes, nose and diarrhea were typical. Coccidia began to appear with the beginning of diarrhea; disappeared on recovery. Recovered, but proved susceptible to a subsequent injection of 5 ccm. of virulent blood (citratd) on March 28th. Recovered again, however. During this second attack, all symptoms appeared in well defined form.

2nd: A susceptible Fuga cow (smaller animal) showed a typical attack of Rinderpest after receiving a subcutaneous injection of 1/10,000 ccm. of virulent Rinderpest blood (diluted). Injected eyes, discharge from nose and mouth, dry scaly skin eruption on neck and forequarters, temperatures of 39.5° to 40°, abdominal pain (cramps), diarrhea and dysenteric, slimy discharges. Coccidia appeared in evacuations in immense numbers. Died on 19th day. Lesions characteristic.

3rd: Another susceptible Dalupiri bull, a very robust animal, received 1/1,000,000 ccm. virulent Rinderpest blood (diluted) subcutaneously. It developed a moderate attack of Rinderpest; highest temperature 39.8° to 40° on the 12th and 13th days; anorexia; drowsy; discharge from nose, injected eyes; diarrhea during a few days only, when feces were dark colored and offensive. Coccidia in great numbers; later marked drooling. Good recovery in about 16 days.

As a result of a subsequent subcutaneous injection of 10 ccm. virulent Rinderpest blood (citratd) on March 28th, animal died on 17th of April from a typical attack of Rinderpest. Lesions characteristic.

4th: Another susceptible Fuga cow, neat, nervous animal, received 1 100,000,000 ccm. of virulent Rinderpest blood (diluted) subcutaneously and developed a typical attack of Rinderpest. Injected eyes, frequent urination, moderate diarrhea, discharge was offensive, blood and mucus in feces, coccidia in masses; discharge from nose and drowsy appearance; marked distress. Made good but slow recovery in about 20 days; was greatly emaciated.

Injected with 10 ccm. virulent Rinderpest blood (citratd) on March 28th, animal showed slight diarrhea, diminished appetite, nasal discharge, temperature of 39.6°. It died from acute bloat, due to indigestion, on April 17th. No marked lesions characteristic of Rinderpest were found on post-mortem examination of the carcass; emaciated, however; tissues bright and clear.

These experiments demonstrate, that the contagion exists in minute form in the blood of animals during the febrile stage of Rinderpest and that minute quantities may transmit the disease. The

small amounts were obtained by diluting 1 ccm. virulent Rinderpest blood with increasing amounts of physiological salt solution and were carefully injected with sterile, close fitting Record syringes.

Subsequent attacks due to much larger quantities of virus speak for an amount of virulent material resulting in super-infection, a condition characteristic of protozoan diseases (Malaria, Texas Fever).

The time between the first injection of virulent blood on February 22nd and the second injection, March 28th, was too short. The complicated processes occurring in the tissues and hemogenetic organs resulting in the production of anti-bodies are not well understood; it has been observed, however, that active immunity or greatly increased resistance is acquired slowly. Schilling⁶.

The discharges from the eyes, the nose and the bowels were characteristic and changed with the course of the disease. In diarrheal and dysenteric mucous discharges, coccidia could invariably be found in immense numbers, often several hundred in a microscopic field. Mucus was obtained by washing the fecal discharges and fresh material was examined with 1/6 objective. Mucus may be passed through fixing fluids (Zenker's or Bichro-acetic) washed and preserved in 5-10% Formalin solution.

After studying a great number of so-called cases of Rinderpest in many localities, I looked carefully through available literature and found that many observers, Eustace Montgomery⁷, A. Balfour⁸, Hutyla and Marek⁹ state, that symptoms and lesions of Rinderpest and Coccidiosis are similar, often identical. The descriptions as found in several of the best text-books on veterinary science usually correspond. In Hutyla and Marek⁹, Volume I, p. 248, under "Differential Diagnosis" between Rinderpest and Coccidiosis, we find the statement that:

"Excreta retain their original color for a longer period in Coccidiosis than in Rinderpest, but may become mixed with blood even at the beginning of the attack."

Further we find the statement that:

"Coccidiosis remains exclusively confined to the intestinal tract and in older animals the rectum is the seat of severe lesions."

Whereas:

"the mucous membranes of the nose, mouth and eye remain normal."

A further statement says that the disease (Coccidiosis) is not contagious, and

“4° cannot be transmitted even by inoculations.”

The first assertion is not important and requires no specific answer.

The second and third statements are contradicted by all observers of Coccidiosis in rabbits, cats, hogs, chickens and other birds, Basset⁹, (1909), Fantham¹⁰ (1910). Sussman¹⁹ (1912), says that usually coccidian Rhinitis in rabbits appears as a sequel to coccidiosis of the intestines or liver.

Brugge, Warringholtz und Stieg¹² (1909) furnish a good description of coccidiosis in cattle. They also quote Zürn (1878), from whose original article they publish important parts. Zürn's article is very interesting, because it is the first publication on Coccidiosis—Red Dysentery—in cattle. His post-mortem notes give a splendid description of lesions as found in animals dead from acute gastro-intestinal coccidiosis. He carefully mentions the changes on the nasal mucosa, the pharynx, the trachea and the eyes. Zürn¹³ (1878), wrote:

“During life the diseased animal showed marked weakness, they were languid, laid down a great deal; when they attempted to move their gait was unsteady; emaciation increased gradually, the coat was staring; the eyes sunken, between the lids and conjunctivae smeary slime collected; slimy discharge from the nose, weak cough; moderate fever; respiration was normal, appetite capricious, intermittent diarrheal and offensive evacuations from the bowels; tucked up abdomen.

Microscopic examination of parts of intestines demonstrated a serious enteritis due to gregarines. The psorosperms were found in immense numbers in the solitary follicles of the small intestines and even in the enlarged mesenterial glands.”

The process, due to coccidia was evidently not confined to the intestinal tract.

The rectum may or may not be the seat of severe lesions; in severe attacks of coccidiosis, the protozoan can readily be demonstrated wherever lesions are found, in the conjunctival sacs, the nasal discharge or in the structures of the intestinal walls and contents.

The experiments described above show that coccidiosis can readily be transmitted by blood inoculations, provided the blood is taken from an animal during the febrile stage, when the virus multiplies rapidly in the blood vascular system. Protozoa go through a more or less fixed life-cycle and the period during which the blood is secured determines its virulency. Veterinarians in charge of im-

munization-stations in the Islands have a great deal of practical experience on this point. It is well known that when blood is secured too late, a larger quantity of it is required to transmit the disease. This is due to the fact, that the protozoan has passed out of that stage of its development where it can multiply rapidly in the blood.

These observations prove that even the fourth assertion of Hutya and Marek is not correct. Whenever susceptible cattle or carabaos are subjected to simultaneous inoculations of virulent Rinderpest blood and anti-Rinderpest serum, they invariably show the symptoms mentioned above. In all cases of constipation, diarrhea or dysentery resulting from these blood injections, coccidia can be demonstrated with facility in great numbers. In cases that recover, agammonous forms become gradually less numerous; in severe cases they persist.

Observers agree that post-mortem lesions as well as symptoms are practically identical, and that in both diseases marked deviations occur.

Balfour¹⁴ (1911) reported from Egypt that he was called to see cattle at Kodack, on the White Nile. The animals were suffering from what certainly appeared to be Rinderpest. On revisiting Kodack he found a small herd of sick cattle, which were weak, anemic and appeared to have a mild attack of Rinderpest. Some had died. Goats with them were found to be infected with coccidia. In the light of these facts (and timely warning issued by Montgomery), it appears that the cattle at Kodack which appeared to have Rinderpest may very well have been suffering from coccidiosis.

Coccidia can readily be demonstrated in the discharges from nose and eyes in animals showing these symptoms in Rinderpest, by the same simple methods that would be used to identify the protozoan parasites in rabbits or fowl.

The description of lesions and symptoms of Coccidian enteritis in cattle as found in Law's¹⁵ text-book describes the great majority of acute cases of Rinderpest correctly. On the other hand, if you desire a detailed description of symptoms of acute coccidiosis, read the article on Rinderpest in Hutya and Marek⁵.

During December, 1914, I visited the Immunization Station at Mexico, Pampanga, P. I., where carabaos were subjected to simultaneous immunization against Rinderpest on a large scale. Several hundred animals were subjected to the treatment every week; Dr. John R. Burns, the veterinarian in charge has had a great deal of

experience in this kind of work. When a susceptible animal, which showed high temperature and beginning of severe diarrhea—caused by injection of virulent Rinderpest blood sent out from the Laboratory at Alabang—was exsanguinated, the stomach showed hyperemic areas and diffuse inflammation of the mucosa. In parts of the rectum beginning desquamation of the epithelium could already be observed. In fresh material from all the lesions sporozoites and schizonts could be found in great numbers.

In the thick secretions from the inflamed eyes of severe carabaos that were examined, schizonts in different stages of development could often be recognized.

The nasal mucous membrane, as well as the folds of the post-pharyngeal regions in different species of animals often show severe invasions by coccidia. They are commonly found as schizonts, round or oval bodies, in different stages of development, and appear to multiply rapidly, not only in the epithelial cells, but in albuminous secretions that are moist or semi-fluid, (intestinal casts, mucus flakes, etc.). At first the nasal discharge is serous, then it becomes mucoid, whitish, thick, even streaked with blood. Its character may also be influenced by a multitude of secondary invaders. The respiration may become difficult because coccidia begin to develop in the bronchioles and lung tissue.

Evidently the virus is carried throughout the organs by the blood and the protozoa develop wherever suitable environment is found: they require oxygen. This explains why coccidia have been found on the pleurae, in the lungs and many other organs. Basset¹⁵, R. Metzner¹⁶, anonymous article in *Progrès Vétérinaire* 1912 *La coccidie du Dindon*¹⁷.

Rinderpest in the Philippines disappears during the dry season and reappears soon after the rains begin. Certain sections (Pampanga, for example) are never entirely free. Animals kept and pastured on the fields of Pandacan Quarantine Station located in a bend of the Pasig river, near Manila, showed no evidence of coccidian infection during the dry season of 1914. A few weeks after the rains began, however, the same animals, running on the same pastures, showed constipation, feces were formed into round hard masses, covered with more or less mucus. In some instances, large flakes of mucus were passed, a simple microscopic examination of this mucus never failed to demonstrate great numbers of merozoites or schizonts in different stages of development. In a series of ob-

servations extending over say ten days, all the forms of the coccidian life-cycle, with the exception of oocysts could be observed. This corresponds to the reports on coccidiosis as observed by Balfour^s and Montgomery^r in Africa. Cattle, carabaos, goats, sheep, horses and chickens were afflicted, showing the disease in its chronic form. All these animals were carriers, having evidently taken up the parasites in limited quantities, on infected pastures and being accustomed to their presence in their alimentary tract, they showed no grave symptoms.

A great number of animals from different parts of the Islands were observed, often on the day that they left the steamer which brought them to Manila. The common symptom was constipation: feces being in the shape of hard, dry, oblong or roundish balls or discs, covered with mucus, often streaked with blood. Occasionally an animal was observed during a diarrheal period, when the last part which passed out was composed of slimy mucus in which roundish or pear-shaped, well formed, ivory white firm lumps of mucus, 1 or 2 cm. long and half as thick, were found. The microscope showed that these contained no cellular structures, but were composed of masses of round or oblong bodies with more or less distinct outlines and a denser round central zone—schizonts in all stages of development. These more or less pear-shaped lumps have often been mentioned and considered characteristic of Rinderpest. Schizonts in this stage resemble ova of oxyuris, but are invariably of different sizes.

Instances where so-called Rinderpest has been carried into clean herds by fodder cut on infected fields have been observed several times.

In 1913, Rinderpest appeared suddenly in two dairies on Calle Alix in Manila a few days after the cows—previously fed on hay—were supplied with grass cut on wet fields. In one dairy, 24 animals out of 26 died. These milk-cows were valuable Australian animals, known to be very sensitive, and therefore kept well isolated. All circumstances point to a common source of infection—the green grass from infected fields.

Soon after the beginning of the rainy season, about July, 1913, guinea-grass (*Panicum maximum*) was cut in the fields of the Pandacan Quarantine Station, loaded into canoes, taken down the Pasig river to the launch that made regular trips to the Matadero at Sisiman, where Australian cattle are kept in quarantine until they

are slaughtered. The distance from Manila across the bay is approximately 30 miles. None of the men employed at Pandacan accompanied the shipment. The Australian cattle proved to be very susceptible, many became sick about the fourth day after eating the fresh grass. Several died. Diagnosis established from symptoms and lesions by the veterinarian in charge: Rinderpest, acute form. Cause: infected grass, cut in fields that had been fertilized heavily with manure from cattle that were being immunized against Rinderpest. The Doctor stopped feeding forage from the Pandacan fields at once and without other measures the sick animals improved and the outbreak was checked. Detail history and post-mortem reports relating to these two outbreaks can be found in the files of the Insular Bureau of Agriculture in Manila.

Similar observations have been made in Shanghai. Keylock¹⁸ (1909) reports that Rinderpest which is endemic in the coast region and river deltas of China, is brought into the dairies by means of feeding materials, oilcake meal and rice straw. In fact, he says, there is no other way than the latter to account for some of the outbreaks of the disease in local dairies.

Coccidia are evidently only facultative parasites. They develop during the warm moist weather, dry out, assume resistant form and lay dormant, probably in sporelike form until placed in favorable environment—as in the intestinal tract of ruminants. Outbreaks that occur in northern China and Manchuria in winter, when the country is covered with several feet of ice and snow, and when cattle are seldom moved from place to place, are due to infected fodder. The protozoa developed during hot, moist summer weather, adhered to the forage plants when they were gathered, remained dormant until fed to animals in winter and reproduced the disease if the new host was not resistant to their development.

The best places to study coccidiosis in its chronic form are the cattle pens and killing beds of the abattoirs in Shanghai. About 75% of the Chinese cattle shipped to the Shanghai abattoirs are afflicted. I am indebted to Dr. Arthur M. Stanley, Chief Health Officer of Shanghai, for permission to examine cattle and pens in the slaughter-house in the International Concessions *ad libitum*. The authorities of the French Concession readily granted permission to visit the abattoirs and cattle sheds in their Concession; in this place observations could be made on Chinese buffaloes (carabaos) which were slaughtered according to Mohamedan rites.

Coccidiosis must therefore be regarded as extensively distributed throughout the coast region of China and Manchuria, affecting not only cattle and buffaloes, but also sheep, goats, deers, hogs, chickens, ducks, geese and many species of wild animals.

Upon my return to the Pacific Coast in April, 1915, reports soon reached me that in many localities young stock had died under mysterious circumstances. Some stock owners thought that the animals were poisoned. Veterinarians were not able to identify the cause of the losses—which appeared to be due to a complication of diseases; hemorrhagic septicemia, malignant catarrhal fever, symptomatic anthrax, all were considered as possible factors.

Knowing that Manchurian corn has been imported in ever increasing quantities during the last three years, and that corn, oil and bean-cakes come from highly infected territories, my curiosity was at once aroused.

The fact that a great number of the cattle in our dairies were constipated and showed, during certain periods, feces heavily coated with mucus, even tinged with blood, attracted attention at once. Occasionally animals with intermittent attacks of slimy diarrhea were found. The microscope invariably demonstrated the well known forms of coccidia—identical to those that had been observed so often in Far Eastern countries. In all the dairies where the bulls are kept penned up and fed on alfalfa hay from the irrigated districts of eastern Washington, these animals were severely afflicted. A visit to local stockyards solved that puzzle. When a train-load of steers from the irrigated districts around Toppenish was unloaded, many animals showed the characteristic constipation and hard, dry, caked feces, covered with heavy layers of mucus. Microscope showed coccidia in the form of merozoites and schizonts in great numbers.

Evidently the irrigated districts, subjected to cold winters and hot summers, supplied with a liberal amount of moisture during the growing period of alfalfa, have become infected and present favorable environment for the multiplication of the protozoa.

Doeflein¹⁹ says that many protozoa have a remarkable ability to overcome unfavorable circumstances. Often a period of rapid division ends with the production of an encysted zygote, which is able to multiply only after a drying out (resting) period. When the required moisture is again supplied, a new period of rapid division begins. A large number of this type of protected zygotes

can, under favorable conditions, produce an immense number of sporelike, resistant individuals, ready to infect new hosts.

I believe that to this peculiar ability to adapt themselves to circumstances, must we ascribe the sudden appearance and maintenance of virulent coccidiosis among our domestic animals. Text-books are silent on this important phase of multiplication and development of coccidia in nature. We are ignorant.

After observing chronic forms of coccidiosis, and securing specimens for reference and comparison with those from the Philippines and China, opportunity presented itself to study a local outbreak.

In the vicinity of Alder, on the Tacoma and Eastern R. R., cattle died from this unknown cause during the spring and summer of 1915. The first animal attacked was a family cow, brought into the camp and fed on eastern Washington alfalfa hay and Manchurian corn. The animal was very sick last fall, but recovered. It was moved out to a pasture where calves were kept. Another family cow, kept on the same pasture then became sick (Mr. M.'s cow.) It recovered. Then the disease appeared among Mr. R.'s cattle, three miles away. Stock in the vicinity of Alder runs at large in the woods and on logged-off lands. Water is plentiful during the wet season, but mostly limited to surface water in low places during the summer months. Only cows appeared to be affected so far; one of Mr. R.'s died. Next Mr. M.'s animals were observed to be sick. The cows were very sick, milk secretion ceased, suckling calves died (the calves run out with the cows). From this on the outbreak spread to different groups of cattle. It was observed that cattle that frequented a certain water-hole (blasted out to catch surface water for use in logging engines) became sick. Mr. S.'s cattle are said to have become infected in this way. Cattle that were sick stopped eating, appeared drowsy, were quiet; diarrhea with mucus and bloody streaks were observed in all cases. Frequently the animals had been sick several days before they were taken up; several succumbed so rapidly that they did not lose flesh; they simply died three or four days after they were observed to be sick. When they passed over the critical period, recovery was rapid. Some had no fever. The eyes appeared injected and inflamed, discharge from nose was serous at first but soon became thick and slimy; drooling was a frequent symptom, ulcerations on lips and dental pads were noted in several cases. The discharge from

the nose was often streaked with blood or showed a reddish tinge. In animals that suffered from severe diarrhea, large pieces that looked like pieces of intestines passed out (3"-5" long, about 1" in diameter); also large blood-clots. Some animals simply laid down and died or got well, one rancher assured me.

Specimens secured from feces of a gentle range cow and a steer—both animals having passed through a severe attack of the disease, showed coccidia in the mucus flakes. From feces near the water-hole in question, as well as from surface scum of aquatic plants, cultures showing coccidia in great numbers, were obtained. No post-mortem examinations could be made.

During routine work, while examining a well kept, large dairy herd near Seattle, I observed that a great number of cows passed feces heavily coated with mucus; some animals showed slight, chronic diarrhea, others constipation. Young animals had been attacked by what was accepted as hemorrhagic septicemia during February; one young heifer died, one was killed and one recovered. Manchurian corn was ground and fed from the beginning of January; it was very dusty and of poor quality, but cheaper than American corn. The rations consisted of eastern Washington alfalfa, hay, ground Manchurian corn and ensilage.

Within a month after beginning to feed the Manchurian corn, the three young heifers became sick. The outbreak occurred during freezing weather and could not be blamed on infected pastures.

In July, other pure bred calves were seriously afflicted. When examined, the bull calf had been sick five days; temperature 105°, difficult breathing, grits its teeth, anorexia, slight drooling, copious nasal discharge, slimy, thick, yellowish or white, not tinged with blood; bowels rather constipated, but little peristaltic movement, abdomen tucked up; feces formed into soft dark masses or discs, covered with heavy layer of mucus; every passage showed a mucoid, slimy, thin, transparent last part. The condition of the calf had improved slightly during the last twelve hours, but it was still in a serious condition. It drank milk and water.

A heifer calf had a temperature of 108°, was very weak, showed copious thick, slimy, whitish nasal discharge, occasionally slightly streaked with blood; deep erosions in nasal mucous membranes; did not drool as much as its mate. Abdomen tucked up, calf showed pain, at times it was quite restless. It suffered from severe muco-sanguinous dysentery; croupous membranes and large masses

of blood-tinged mucus being passed frequently. No skin eruption could be noted. Condition critical.

History showed that as long as the calves were pastured on the hill they were in splendid condition. The dairy cows—which were severely infected with coccidia, several showing occasionally blood-covered feces—were turned out into a small pasture near the barn over night. They were driven somewhere else and the calves were brought from the hill and turned into the cow pasture. After being on this infected ground—a small brook running through it, forming many small pools of stagnant water—for about three weeks, the disease made its appearance after three weeks of hot weather,—evidently due to the infection carried by the cows (chronic carriers of coccidia) into the moist and wet ground along the stream where coccidia found favorable conditions for development and from where they were taken up by the calves drinking and cropping close the green plants on the moist soil.

Examination of other calves showed other cases, not so serious, that had been overlooked: constipation, covered or slimy feces, slight nasal discharge, rapid, shallow breathing.

Young bulls were kept in a small pasture below the calves, the same brook running through it. Many of these animals showed distinct nasal discharge—some more, some less—a few showed only clear serous discharge and slight drooling.

Careful microscopic examination of the material collected from the calves and from a particularly severely affected cow demonstrated more masses of coccidia—merozoites and schizonts, in the intestinal discharges as well as in the slime from the nose.

The diagnosis was therefore established as coccidian intestinal catarrh in the cows, and coccidian gastro-enteritis, with complication of the upper air passages and lungs, acute type, in the two calves.

Three other outbreaks of the same disease have been investigated—two near Tacoma, and one near Seattle; history and symptoms correspond and the same diagnosis was made, being duly supported by careful microscopic examinations. It is an easy matter to collect specimens, but care and time are required for careful laboratory examinations.

Letters from many parts of the Sound country have reached me, all reporting losses due to some new and therefore mysterious disease. Rough estimates would place the losses among young stock

during this spring and summer at several hundred animals. If the moist pastures and climatic conditions provide environment favorable for propagation of coccidia, severe outbreaks of this serious, dangerous disease must be looked for among our valuable herds of ruminants. The disease began to appear about four years ago, and appears to be disseminated and causes serious losses, especially among young animals throughout the western parts of the state.

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ABSTRACT OF DISCUSSION.

DR. EICHHORN: Our knowledge regarding rinderpest is based entirely upon the observation and research work of scientists who have devoted much study to the subject. We have accepted rinderpest as being caused by the ultravisible virus and now it is claimed by Dr. Schultz it is caused by coccidium. He claims that the coccidium is found in the blood: that is, in certain stages of so-called rinderpest the blood is ineffective as a result of the appearance of the coccidia. I think this is very important, and the case becomes still more important for the livestock industry and the veterinarians of the country since he claims that we have the disease in the United States. This is of vital effect to the stock industry, and it is remarkable that no one ever gave this matter a thought in the work on infectious diseases, if it is found that we have a disease resembling rinderpest as described and discovered in the various countries of the world where the disease occurs. Of course, I am not myself an authority on rinderpest. I never saw a case except in museums, but it certainly would be interesting if some one here who had seen rinderpest and examined it would discuss it. It certainly would be of great importance. But I doubt whether rinderpest which is thought not to exist in this country is identical with the disease which Dr. Schultz found in Washington.

DR. K. F. MEYER: I have seen coccidiosis and I have seen rinderpest, the latter in Africa. Coccidiosis has been observed by myself in Switzerland and there it always has been, and is being considered as a mild intestinal infection. We have seen cases with severe diarrhea; under proper treatment they always return more or less to a condition so they can be used afterwards for slaughter. In such cases I have made a very careful examination of the feces and I have never found bodies which could be considered as agamonts, or gamonts. In some epithelial cells, elements suggesting development stages of coccidia were noticed but could not with certainty be identified as such. In all cases we found the coocysts and spore stages of the life cycle of the coccidium. We have to keep in mind that the coccidia are epithelial cell-parasites, and that their entire cycle is passed inside the cells, particularly is that the case with the agamonts. When the asexual development has exhausted the parasite, the sexual development leads to those elements we can detect in the feces or discharges. We have an elimination of those elements which are capable of reinfection and distribution of the parasites. During the asexual development the most severe symptoms are recorded. The liberation of "paroxysmal" toxins which are set free at every schizogony of the agamonts cause the systemic disturbances. I have never seen that these conditions are due to the parasites being actually carried into the blood, so that we have merozoites in the blood, as Dr. Schultz claims to have observed.

Numerous statements in the literature that coccidia enter the blood stream refer to cold blooded animals only, or to observations which can easily be proven by a skilled protozoologist to be incorrect. I have never seen any report concerning the findings of development stages of coccidia in the blood stream of cattle, and to again repeat: in my prolonged study of coccidiosis of cattle in Switzerland I have never observed any elements which would at least suggest such an explanation.

It is an easy matter to mistake plant cells or other debris in the feces of cattle or animals in general, for coccidia. I have had students who associated the always present yeast cells in feces with coccidia. I recall the statement made in 1910 in the eastern part of the United States: that coccidia can be found in every animal. The diagnosis was made on preparations stained for tubercle bacilli, and all the oval bodies stained reddish were identified as coccidia. That these bodies had nothing to do with these parasites was easily proven, but it is another example to show how easily mistakes are made and how careful one should be in the microscopic diagnosis of coccidiosis or allied infections.

I will not deny that coccidiosis exists to a certain degree in the United States, but it is an infection which does not lead to the death of the animals, just as we observe, accidentally, coccidiosis in the dog and in the cat.

Rinderpest is caused by a filterable virus and there is no question but that conditions, to which I shall briefly refer, exist also in this infection which may possibly explain the findings of Dr. Shultz.

We noticed in South Africa that animals suffering from chronic or latent piroplasma-infections have always had a severe relapse to which they frequently succumbed when infected by a filterable virus, like horse-sickness, heart-sickness or rinderpest. The usual blood examination will be negative until the relapse takes place. We are dealing, in these conditions, with a carefully adjusted equilibrium between immune bodies and protozoan: as soon as this adjustment is disturbed through a new factor, in our case, the infection with a filterable virus or a bacterial cause, the protozoa are no longer controlled in their development, and the clinical picture of a relapse is evident. For the same reasons, it is not surprising to find marked symptoms and positive findings of coysts of coccidia in the feces of Philippine cattle when they are suffering from rinderpest. In all probability these animals harbored the coccidia in the intestinal tract, and before the rinderpest infection took place were harmless for the animal. Such conditions exist in Central Africa and can probably be found elsewhere.

I therefore consider it absolutely unwise—for the reasons just mentioned—to insinuate that rinderpest is a form of coccidiosis.

I will not deny that Dr. Schultz has seen rinderpest and has proven that coccidiosis exists in the Philippine Islands and also in

the state of Washington, but further careful experiments have to be made before the conclusions can be drawn that both diseases are identical. Numerous publications have, from time to time, appeared in the literature in which coccidia were claimed to be the cause of such-and-such a disease. I cannot recall having ever seen one of these reports confirmed.

DR. SCHULTZ: It is very fortunate and I am very glad that Dr. Meyer has passed judgment and has explained himself so pointedly. In the first place he says that the quotations from literature are old. After I left the Bureau of Agriculture in Manila I spent three months reading and comparing the different articles on this subject, because I knew that the Library of the Bureau of Science in Manila was better equipped and more complete than we have here. Appended to this article you will find a list of 19 publications relating to this subject. I have a comprehensive knowledge of the literature relating to coccidiosis, and am especially familiar with the articles of Guillebeau and Schaudinn, as well as Hess, Zschokke and Zueblin. After considering all these sources I advanced my deductions. I have read Hadley's and Fantham's and many other articles on the same subject. I made the statement that coccidia in the blood had been demonstrated by several investigators, notably by Pianese (Transaction Pathological Society London Vol. 21, 1890 p. 320) in the veins of infected rabbits. Reference to this is found in "Die thierischen Parasiten des Menschen" by Max Braun, 4th Ed. 1908 p. 107. A few years ago Clemens Heindl wrote a Doctor Thesis at the University in Berne in which he described coccidia in the small blood vessels of the liver. I have sent for this publication but have not yet received it. Probably the first investigator who referred to or demonstrated coccidia in the blood was Balbiana (Lecons sur les sporozoaires, Paris 1884) and since then different statements that coccidia in one form or the other were found in the blood have been made and accepted. Doefflein states that *Isospora Lieberkuehni* is carried in the bloodstream, and I know that Dr. Meyer will accept Loefflain as an authority on Protozoology. I also give as reference in the appended list, an instance where coccidia have been found in the lung, in the diaphragm, the liver and throughout both body-cavities. They could not possibly be disseminated in such a manner unless carried by the bloodstream (*La coccidiose du dindon*, No. 17).

The doctor says that these protozoa are obligatory parasites. Different publications do not tell us that. If you read carefully the German and other articles, you will find several observers that held a different view. I can mention Eckhard (1903). It has been mentioned by others that they multiplied in mucous and intestinal casts as well as in all kinds of albuminous material when moist and warm. Guillebeau and Hess have demonstrated this, and I have followed their methods. I have large intestinal casts that are teem-

ing with coccidia. They are free from cellular structures. It is therefore not absolutely necessary that the parasite must be in a cell to pass through at least a part of the agammonous life-cycle. We know very little about these protozoa, and their methods of multiplication in nature.

Many other phases of this subject would be of interest. I must suggest however that before any of us can make useful observations, we must read published articles and be sure we are not making mistakes. Look up these authorities and see whether we are right or wrong. If I, an individual, am wrong, there is not much harm done. It is beyond one man's effort to solve these important questions: many observers say that symptoms are alike, lesions are alike, and that therefore it is most difficult to say, this is rinderpest and this is coccidiosis. When we can take carefully selected blood, obtaining it from a laboratory where the disease has been studied for years, inject it into an animal in minute quantities, observe the animal as carefully as possible and report a severe attack of coccidiosis as the result of the inoculation, the subject becomes so important that it must be investigated. On the other hand, I must admit the possibility that the rinderpest-infection was present in latent form and that during any febrile reaction the epithelium became a favorable breeding-ground for the protozoan so that it could develop very rapidly, causing an acute attack of the disease. It is possible that this may occur; it is a matter of opinion only, however. Guillebeau (1893) demonstrated that a rapid division of coccidia occurs at a temperature of 30 degrees centigrade which differs from the usual forms as they occur at temperatures of 20 to 30 degrees centigrade. I have carefully considered this fact and have read Zublein's article (1908) having copies of it in my collection. After all, I thought it worth while to present this paper to you. I hope that some one who is in a position to do it will find out whether I am right or wrong. It is of the utmost importance that these questions be investigated, and my work checked up.

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THE ELECTROCUTION OF ANIMALS*

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In presenting this paper, the *Electrocution of Animals*, I encroach on a subject where the records are few, and the histological changes recorded only general, but I am calling your attention to a practical rather than an economic phase for the practitioner to consider.

*Presented at the meeting of the A. V. M. A. Section on Medicine, Oakland, Cal., September, 1915.

The lesions described are the same, independent of the portal, but the tissues involved vary with the point of contact, and exit of the current, with the exception of the blood and macroscopic appearance of the brain.

The amperes that entered the bodies and the voltage of the line that caused the death of the two horses from which the following post mortem records were made, was not determined: December 22, 1907, at about 8 P. M., found a gray mare dead in front of the car barn of the B. & N. S. R. R., on Merrimack Street, Lawrence, Mass.

The visible mucous membranes were cyanotic, no bloating, the urine had passed from her, she lay on the right side, head toward the right. The autopsy made, the twenty-third, in the morning, showed as follows: Bloated, cyanosis of visible mucous membranes, also the perineum, pupils dilated. Radial veins of the right hind leg were filled with dark blood, also the larger ones. Those of the left leg not so pronounced. The blood flows freely when the veins are cut. On the left side of the neck under the skin the radial veins are very much in evidence and bleed profusely, while in the right side under the skin they show in spots; the mucous membrane of trachea ecchymotic in the thoracic portion; ecchymotic along the union of the large colon; kidneys, spleen, liver and lungs show ecchymotic spots. There is an old circumscribed pleuritic spot over right lung. Radials seen in pericardium, small amount amber colored fluid in pericardium. The left heart very little fluid blood, and a serous clot of small size; right side of heart, empty. Post-mortem rupture of the diaphragm. Brain shows all the superficial blood vessels filled, a clot under cerebellum, both choroid plexii hyperaemic, substance of the brain ecchymotic.

Post mortem of the black gelding owned by A. St. Louis, of Lawrence, Mass., November 25, 1911: bloated, ulcer left foreleg under the fetlock, bar shoe on the right forefoot, aged, pupils dilated, mucous membrane of the buccal cavity cyanotic, body on right side.

When removing the hide from the left foreleg and left side of neck, the blood flowed freely and did not clot. Radials in this region filled with blood; radials filled in right hip with ecchymotic spots, cyanotic. Right side of neck under the skin hyperaemic, and petechial spots extending over the scapular region.

The muscular tissue on the left side of neck hyperaemic, blood fluid, dark, and flowed freely when the tissues were cut, same condition was seen on right side of neck, but not so gross. When the left foreleg was removed from the body the blood flowed freely, when the right foreleg was removed, not so much blood seen. When the abdominal cavity was opened, a small quantity of serous fluid escaped. A small aneurism due to strongyles was found at celiac axis.

A part of the capsule of right lobe of liver on its visceral side was thickened. Anterior lobe left lung cyanotic, with petechial spots and blood fluid. Petechial spots on left heart, small clot in left heart partly amber color, while the right heart was empty. Mucous membrane of trachea, mouth and tongue were cyanotic. Blood vessels in the convolutions of the cerebrum and cerebellum were hyperaemic. The plexus at base of cerebellum hyperaemic.

In the following post mortem records, death was caused by $1\frac{1}{5}$ ampere and 1500 volts, applied for 30 seconds in the dog and 60 in the cat.

In the dog, the current entered the body through a brass collar, with sharp points on the inside, the dog being suspended with only the hind feet resting on the wet metal floor. When taken from the chamber the respirations had stopped but there was a distinct pulsation for some time, but the time not recorded. Rigor mortis absent, pupils dilated, buccal cavity cyanotic, hyperaemia of digestive tract, heart empty, hyperaemia of the brain, the choroid plexii, and base of cerebellum; blood fluid and dark. The blood exposed to air and sunlight in a shallow dish for about one hour, became congealed like jelly, without any serum, but there was a very thin layer on the exposed surface that was scarlet in color.

A cat placed in a closed metal chamber was killed with same measured current, continued for sixty seconds. Post mortem records showed rigor mortis absent, hyperaemia of lungs and digestive tract, petechiae in lungs, heart empty, blood fluid and dark and flowed freely where the vessels were cut.

The hemorrhage following the contact with electric current is difficult to control, in man, and death only occurs when the voltage can force sufficient current the required time, and that will vary with the resistance of the body.

This is well illustrated from the fact that the measured current referred to required from 2 to 3 minutes to kill a kitten and 15 to 90 seconds for a horse.

It is recorded by the Edison Illuminating Co., of Boston, Mass., that the amperage was sufficient on a line carrying 113 volts to accidentally kill a horse.

"Powerful electrical discharges upon the animal's body induce paralysis of the nervous apparatus (especially of the respiratory centre), electrolytic destruction of the red blood cells, local burns of the skin and laceration of the tissues. Death usually follows, but the paralysis and unconsciousness may, after shorter or longer duration, go on to recovery.

"According to Leblanc, horses are exceptionally susceptible to electricity. A horse was killed, for example, by a relatively light current which the owner passed through the bit in order to divert the attention of the animal while being shod." (Kitt)

"The electric current destroys the coagulability of the blood."

"Blood will not clot when death is caused by electric current." Dr. Edward Anthony Spitzka, of New York, says, "The blood is profusely altered biochemically. It is of a dark brownish hue, and it rarely coagulates. Either the fibrinogen or the fibrin element or both are destroyed."

"The anatomical changes, in so far as the internal organs are concerned, in death from this cause may be very slight. Essentially they are such as are characteristic of death from asphyxia." (National Electric Light Association Bulletin, Nov. 1914).

As I said at the beginning, this is not an economic question, but practical for the practitioner, illustrated by the fact that in the case of the horse owned by A. St. Louis, Bay State Street Electric Co. was called upon to pay for said animal. The police and superior courts found for the defendant, but the supreme court reversed the findings in sum agreed upon by the superior court when taken from the jury, if the supreme court found for plaintiff.

Some of the testimony of the expert veterinarians employed by the defendant is very interesting.

Question: "Now, doctor, assuming that the horse was electrocuted, wouldn't there be trouble in the brain?"

Answer: No, sir.

Another interesting answer was that the clot in celiac axis could break up and a clot lodge at the center of respiration and produce suffocation. Without external burns any lesions found in body would not indicate death due to electricity.

In the supreme court of Massachusetts, in the case of St. Louis vs. Bay State Railway Co., under date of December 15, 1913, Chief Justice Rugg handed down the following as a part of the findings of said court:

"As the plaintiff on a wet November afternoon was driving at a moderate speed, his horse stepped on a rail of one of the defendant's tracks in a public way; a spark came from the rail, the horse stopped suddenly, went backward a little and then fell and died. A veterinary surgeon of long and wide experience expressed the opinion, based on the appearance of the organs revealed at an autopsy, which he described in detail and which in some respects was peculiar to electrical action, that the horse was killed by electricity.

There was testimony that the rails and other apparatus and appliances at the place of the accident were in perfect condition on the following morning, but that still it was possible for the horse to be killed by reason of a short circuit between a rail and wire at some point on the track further from the power house than the place of the accident, and that on a wet day there was more danger from wires or rails through which an electric current was passing than on a dry day.

In accordance with the terms of the report, let the entry be judgment for the plaintiff for \$140."

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THE SIGNIFICANCE OF THE FEVER COMPLEX IN THE COW*

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If one object more than another has exercised a controlling influence over my thoughts and motives in the preparation of this paper, it has been to stimulate if possible, a new demand for a progressive and definite understanding of a few of the obscure pathological conditions in the cow.

The dearth of literature on diseases of cattle and their treatment is due to insufficient knowledge of the actual process occurring in the body. Such actual knowledge can only be gained by observations in the field.

*Read before the Ohio State Veterinary Medical Association in Columbus, Ohio, January 13, 1916.

I therefore felt after a few years of practice and thoughtful study that something along this line would be acceptable, no matter how unscientific or reasonably true it may be. But there are not a few processes occurring in the animal body which are so hidden as not to be at all evident to a superficial examination, and yet, they are of the highest importance. It is for this reason, that I propose to call attention, to some consideration of the phenomena of fever in the cow.

Heat of the body, is one of the all important conditions of its mechanism. Physics teaches us that whatever energy is expelled on a machine or device of any kind, an exactly equal amount of energy always appears as useful work or as heat. Wasted work always appears in the form of increased molecular motion, viz. in the form of heat. Thus energy may be transformed but it can never be created or destroyed.

The advance of the physical and physiological doctrine have given us definite ideas as to the relation of animal heat to the metabolic processes of the animal body.

Heat production in the body is the result of vital work. Every organ and cell is engaged in the work of generating heat, which is a process of oxidation going on in a gradual or modified way. The end products of which are carbon dioxide, eliminated from the lungs, and water and urea through the kidneys. The tendency therefore of the chemical changes in the tissues are such as will set free energy in the form of heat. The higher the degree of activity, the greater the rate of heat production. Hence, those organs that are most active in the performance of their duties, the greater amount of heat they will produce.

It is a fact that heat is liberated in the body :

1st. From the food, viz. from the recombination of dissociated food-stuff.

2. From tissue katabolism viz. from the oxygenation of tissue products. Work performed by the cells leads to dissociation in the cell substance, and it is the union of these products of dissociation with oxygen that produce the heat. If therefore, in the febrile condition there be increased production of heat, despite lessened intake of food, and despite a loss of heat which is not less than normal, that increase of temperature can only be due to tissue disintegration and oxidation, or of increased heat production due to nervous influences, it is not the nerve centers themselves

that produce the heat but rather the dissociative changes in the respective cells set up by nervous stimulation that is the cause.

There are numerous conditions that profoundly affect the process of heat production and one which I believe of great importance in the cow is glandular activity. the mammary gland is the source of an enormous amount of heat and I believe has a marked effect on the complex febrile condition in the cow. Likewise the liver, the largest gland-like structure in the body, more richly supplied with capillary blood than any structure in the body. Blood in the hepatic vein during digestion may have a temperature, 3° or 4° higher than that of the portal vein. Other conditions influencing heat production are, muscular activity and digestive activity. Heat production is increased 35% to 40% during digestion. The influence of the external temperature upon heat production is a matter of great practical importance.

Cold applications to the external surface of the body increases heat production, short applications of the heat, lessen the heat production, and at the same time, increases heat elimination, thereby causing a decline of body temperature. A continuous fall in the external temperature can not be withstood. When a point is reached at which the rate of heat production is below that of heat loss, the animal dies of cold. Likewise a continuous rise of external temperature can not be borne as a point is reached when heat discharge ceases. Heat becomes stored up in the body and heat stroke follows. A higher temperature can be withstood in a dry atmosphere as evaporation from expired air and surface of the body does not easily occur in a moist atmosphere.

The processes of heat elimination from the body are due to

1st. Surface radiation and conduction provided the external medium has a lower temperature than that of the body. If hotter, the animal body gains heat.

The loss of heat in the cow through radiation and conduction is comparatively small for the reason that the dry hair of the cow is a poor conductor of heat. When moistened through exposure to rain, or perspiration, its conductive power increases in a marked degree. Heat loss by radiation and conduction is lessened by artificial covering which by imprisoning the warm air interposes a poor conductor.

2. A more important means of heat elimination is found in the evaporation from the mouth and nostrils. The importance of this factor is constantly seen in the so-called "bedewed muzzle" of the

cow in health. From these facts it becomes evident that the need of greater heat elimination is compensated for by the panting respiration.

3. Heat loss through the excreta is another means by which temperature is lowered.

The discharge of heat from the body may be increased, 1. By dilation of the surface vessels. 2. By increased pouring out of sweat. 3. By increased respiration.

Both the production and elimination of heat due to the above mentioned causes are subject to constant and marked variations.

The indications of increased heat production are a moist warm skin or hot dry skin. While those of decreased heat elimination are a cold dry or moist skin, goose flesh appears and shivering. An excessive increase of heat production and without proportionate elimination is present in vital fevers and inflammations.

In order to maintain the temperature at a constant point, heat production and elimination must balance. Otherwise the heat resulting from metabolic activity would continue to rise until the destruction of the animal. Although it has never been proven, there surely must be situated somewhere within the brain or spinal cord, nerve centers, which regulate the production and discharge of body heat. That the new born calf or colt passes as it does from an intrauterine temperature of 101° – 103° to that of zero or thereabouts in the stable in safety if not comfort, would seem to indicate this fact. In fever, this heat regulating mechanism is markedly disturbed. And the facts are adequate to show that the disturbance is in the direction of increased heat production rather than lessened discharge.

The reduction of temperature therefore, in fever, is accomplished either by diminishing heat production or increasing heat elimination or both.

The physiological means by which fever is controlled are by decreased activity, loss of appetite, and thirst. The therapeutic measures adopted to influence heat production and heat elimination are by various antipyretic drugs, but the effects thus produced are purely toxic in character and involve not only the heat producing and regulating centers but other important centers as well, thereby lessening the natural resistance of the body and the activity of the processes of repair.

I therefore believe that the use of antipyretic drugs in fever is

irrational and unphysiological, and when more rational means of combating fever of all types are more thoroughly understood, and more generally used, the mortality from this cause will be reduced.

As inflammation is a reaction on the part of the injured tissue to repair, so have I defined fever, as a reaction on the part of the organism toward recovery. Or, the process of adaptation of the tissues to such toxic substances as can be neutralized by the development of antibodies. So that fever in the course of an infection may be regarded as an indication that the production of antibodies is progressing favorably. While on the contrary, the absence of fever in cases of severe infection may be an indication that the cells are so overwhelmed by the toxins that they can not react in the usual way.

In dealing with fever, it is important to determine the cause which may be simple exposure to heat, violent exercise, exhaustion, a cold with retained excretions, toxemia from decomposing food, or decomposition of food by long retention in the alimentary canal, uric acid, toxins produced in infectious diseases, local inflammations, gastritis, peritonitis, infected surgical wounds, nervous influences microorganism-termed infection is the most important.

It will be perhaps more serviceable to consider the most common general process and in so doing, that systemic reaction to microorganism-termed infection is the most important.

The presence in the body of some active infective material, although its cause and nature vary somewhat in different infections as a rule causes fever, due probably to the absorption of chemical bacterial products. Once bacteria enter the tissue and begin to grow, from that moment on we have the beginning of the infective process, although we are not able to recognize it. If the entrance of the germs be local, there is first a period of local growth with the absence of any general disturbance or observable symptoms. This process is regarded as a period of incubation. But from the onset of the actual disease, we have the supervention of fever that affords us a useful starting point for the establishment of a diagnosis. But quite frequently the absence or presence of fever in a given case in a cow is extremely misleading.

Infection by microorganisms may be local or general thus in the case of pneumonia while the presence and activity of the pneumococcus is at first confined to the lung it extends generally throughout the system.

In like manner the streptococcus infection may be either local or diffuse. In the latter case resulting in extensive septicemia. In both cases the symptoms are brought about by the one common cause, viz. the diffusible toxins. It is the nature and toxicity of these products that are most important in the development of infections. They are the characteristic disturbers of metabolism.

An infectious disease affects metabolism: 1st. by changing either chemically or in amount the substances entering the body. 2. By altering in the same way substances leaving the body.

3. By setting up new chemical processes in the tissues themselves, the amount of substances entering the body through the intestinal tract reduced in infectious diseases in many ways: as by anorexia, by pain from laryngitis or pharyngitis, muscular inability, as in tetanus. The available material may be further lessened by diarrhea, lessened power of the digestive juices, or interference with the intestinal absorption. Regardless of the diminution of the substances taken into the body, the life processes must be maintained and are so done at the expense of the materials stored in the body. And of these, the carbohydrates and fats are the first to be consumed, followed later by the proteid. Such chemical changes alter the substances leaving the body especially the expired air and urine. Infectious diseases further affect the substances entering the body through the respiratory tract. Oxygen, in amount, entering the tissues may be reduced by narrowing the respiratory passages as in edema. The presence of exudate around the alveolar walls, or by a reduction in the oxygen carrying power of the circulating fluids.

Abnormal chemical changes occur in the ingested material from the action of putrefactive bacteria or by excessive action of yeast or through the action of the specific microorganism as well. Lowered acidity of the gastric juice and lessened peristalsis so characteristic of many infections, favor bacterial growth.

Interference with the output from the body may bring about abnormal retention of the products usually excreted. Such as in pneumonia in which there is a formation of a large amount of exudate. On the other hand, there may be abnormal losses as in inflammatory diseases of the kidneys in which the toxins affect the renal epithelium, causing a loss of albumen, globulin and other blood constituents. Probably all of the tissues of the body are profoundly affected in their metabolic activity, either through the direct ac-

tion of the toxic substances or waste products, or indirectly through the nervous respiratory or circulatory changes.

Alterations in the chemical processes within the body due to increased katabolism as shown not only in the increased heat production but in the excretion of an increased amount of the end products of metabolism. Infection may cause death and disintegration of certain cells of the body and a decomposition of body fluids as shown by the breaking down of the erythrocytes in anthrax by parenchymatous degeneration and by circumscribed necrosis in abscesses. The effect thus produced depends largely on whether such tissues are subjected to the action of the bacteria or their toxins or both. In the last case the putrefactive process is rapid and intense. In most cases of acute infectious diseases, the toxic substances pass in the general circulation producing constitutional symptoms best described as toxemia. However, a bacterial intoxication without infection may be observed in various forms of food poisoning, introduced in more or less amount into the gastro-intestinal tract. The symptoms thus produced depend upon the rapidity and amount of absorption. Such cases are common in the bovine species with apparently rapid absorption. The temperature rises to 106° – 108° . In these cases elimination through the intestinal canal by magnesium sulphate generally affords relief.

It is essential therefore in considering bacterial intoxication to distinguish between those following infection preceded by a period of incubation and those due to absorption of toxins without infection.

Among the earliest associated phenomena of fever, are chills. Though the surface of the body may feel cold, the thermometer in the rectum will show an elevation of temperature due to retention of the blood in the splanchnic area and consequent local anemia of the surface vessels. This vascular change naturally involves heat storage within the organism.

Often associated with chills are fine fibrillary contractions of the individual muscles of the face, trunk, or extremities, corresponding to an increased stiffening of the muscles resembling rigors. By this mechanism heat production is reflexly increased. This increased contraction clearly plays a part in the earlier stages of the febrile state. While later it gives away to relaxation and exhaustion and the muscles of the body seem to diminish in size more quickly than can apparently be explained by the combined lack of

exercise and lessened assimilation. This rapid burning up of the muscles as it were, is another indication of increased heat production.

In certain stages of acute infections, we find the pulse full and bounding and in others weak and easily compressible. In all cases the heart-beat is decidedly increased in rate. In a prognostic sense strengthening of the pulse and lowering of the rate is a favorable sign. Whenever the bed of the blood stream is widened in any considerable area without corresponding contraction of the bed at other points, where there is lessened resistance to the flow of blood, pressure sinks, and the heart-beat increased in rate. The general lack of body tone and muscular vigor during the course of a high fever indicate that such a factor is at work.

The increased rate of respiration is a cardinal symptom in the course of an infection. Such increased rate is common to all conditions in which either the body is exposed to increased external temperature or the body temperature itself is raised. This is one of the means of discharging and reducing the heat of the body. Whether this is the primary result or not, anything which increases the temperature of the blood bathing the respiratory center, leads to an increased rate of respiration, whether it is beneficial to the organism or not. The accumulation of carbonic acid in the blood affects the respiratory center as well. Increased temperature favors increased metabolism in the individual tissues, and heightened metabolism means increased using up of oxygen, resulting in excessive elimination of carbonic acid and the higher the temperature, the greater the absorption of the one and discharge of the other. Thus we have the primary cause of increased respiration and also a striking demonstration of what must be regarded as the prominent underlying feature of fever, viz. greatly increased metabolism, that metabolism leading to increased temperature, to increased discharge of carbon dioxide in the blood, and to the increased rate of respiration.

The amount of urine passed is diminished during fever and what is passed is concentrated and high colored, due to lowered blood pressure and increased discharge of water by the lungs, skin and in some cases the feces.

Anorexia is characteristic of all fevers. The mucous glands of the stomach and intestines are busy excreting toxins from the system. Therefore they can not be equally active in their absorptive

duties. Or the cells of the tissues in general devote their energies to the elaboration of an antitoxin instead of the commonplace assimilation of foodstuff.

Emaciation is also common in long continued fevers. Despite the lessened intake of food, there is a reduction of the fatty tissues. Fat is capable of giving off more calories than any constituent of the body.

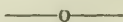
There is in fever, to repeat, no mere retention of heat but a most evident increased production.

Now, it is noteworthy that in all of these, the reaction results in the production of antibodies, of substances which neutralize the toxic substances. In recognition of this fact, we coincidentally gain insight in to the essential nature of fever. In view of the foregoing, in cases of severe infections instead of a rise of temperature, there is a progressive fall, or occasionally a transient rise followed by a rapid fall, which continues until a point far below normal is reached, and death ensues. The tissues in short are poisoned and there is no adequate general reaction. There are cases on the contrary in which death occurs in hyperpyrexia due, however, to the selective action of the toxins, as in tetanus in which the selective action is on the nervous system. But the general reaction is proceeding vigorously.

After all, is an increase in temperature in itself a serious part of the pathological process, a symptom to be fought and if possible removed from the body, or is a rise of temperature in a nature of protective mechanism? That fever is indeed a consuming fire, but a fire that wastes the body to destroy the bacteria?

At this point, I am conscious of having exceeded the limits of my time and possibly your patience. Diseases of the cow (now that nearly everybody owns or intends to own an automobile) are daily coming into greater prominence. Our responsibility is shifting somewhat and it behooves us, it seems to me, in recognition of this fact, to do more than we have heretofore done in the pathology and treatment of her diseases. There still remains, in spite of our knowledge, considerable obscurity in our bovine pathology. What, for instance, is the cause of milk fever? Is the paresis a chemical or vascular phenomenon? Can any one explain why inflation of the udder meets with such marked success? What is Dr. Steffen's so-called persistent anorexia, an afebrile condition, so often met in our daily practice with cattle? Or likewise paraplegia, or his so-called

bovine azoturia, usually an afebrile reaction? Has any one ever made an examination of the intraspinal fluid in such cases? I could continue as we all could, indefinitely, in this direction, but decency forbids. Let me conclude by thanking you for your patient attention and with the hope that my subject may call forth a discussion calculated to illuminate the points which I have briefly enumerated.



DISEASES AND TREATMENT IN IOWA*

Hemorrhagic septicemia has been reported from practically all parts of the state. It is probably being more generally recognized and also is increasing in prevalence. The *B. bipolaris septicus* is apparently of much more significance than was supposed as it seems capable of producing disease in most of our domesticated animals including fowls. The tendency for the disease to occur without any apparent introduction of the infection from diseased animals and the fact that some of our best pure bred herds have suffered heavy losses makes it especially important that steps be taken leading to an early recognition of the disease and the adoption of such preventive measures as are possible under existing conditions.

Among cattle the disease is frequently acute and accompanied by nervous symptoms such as intense pruritis which may be severe enough to lead to laceration of the skin on sharp objects in attempting to relieve the disagreeable sensation. Other nervous symptoms are apparent blindness and clonic spasms especially of the head and neck. Such cases usually die in sixteen to twenty-four hours and the mortality is very high, especially among young calves.

Prevention and treatment consist of removal of the healthy animals from the diseased ones and providing a change in source of food supply and uncontaminated drinking water. As infection is eliminated with the feces, steps should be taken to properly dispose of feces from infected animals.

Serum from horses and cattle immunized by injections of increasing doses of pure cultures of the *B. bipolaris septicus* is prov-

*Report of the committee on Diseases and Treatment, presented at the meeting of the Iowa Veterinary Association, Des Moines, Ia., January 16. C. H. Stange, Chairman; F. R. Ahlers, L. U. Shipley, A. L. Wood, John Paterson.

ing to be of value in treating sub-acute cases as well as conveying a passive immunity. While the work along this line is still largely in the experimental stage, the work of the research department of the veterinary division points at present to the indication for the use of serum on those animals already infected and vaccination or sero-vaccination of those not infected.

TUBERCULOSIS. This insidious disease is taking increasing toll from our live stock industry. The following significant table was prepared by Dr. W. E. Simonsen, with figures received from the Bureau of Animal Industry, gives the number of affected animals in federal inspected abattoirs:

Year	UNITED STATES		IOWA	
	Cattle Per cent	Hogs Per cent	Cattle Per cent	Hogs Per cent
1907	.31	1.3	4.52	1.69
1908	.72	1.2	1.26	2.61
1909	.85	1.5	1.64	3.22
1910	.95	2.6	2.02	3.67
1911	.90	2.8	2.71	4.86
1912	1.14	1.01	2.81	6.54
1913	1.11	1.25	3.02	7.37
1914	1.10	1.36	3.66	9.37

Attention is called to the fact that in 1914 the percentage of tubercular hogs was five and one-half times as great as seven years previous. This not only presents a situation concerning our swine industry which requires attention but it is also a highly significant indication as regards our cattle. Iowa slaughtered hogs were 6.8 times as tubercular as the average hogs of the United States slaughtered during the same year and under the same system of inspection. Cattle were 3.3 times as tubercular as the average for the United States.

If, as statistics indicate, 9.37 percent of Iowa's hogs have tuberculosis, a large percentage of which probably become infected from cattle, we are having greater involvement of our animal industry and hogs especially with tuberculosis than hog cholera, as the percentage of losses from hog cholera are less at present than the reported cases of tuberculosis.

In the suppression of tuberculosis it is doubtful if any plan will be successful which provides for the destruction of all animals reacting to the tuberculin test. Especially is this true if just compensation is not provided for. Privilege of slaughter under in-

spection while valuable where nothing better is available does not take the place of reimbursement. The Bang method which has been quite successful in Europe, is, however, not well adapted to our agricultural conditions. Two other plans which give promise under circumstances such as surround the campaign against tuberculosis in the central west are:

1. Plan of Ujhelyi of Hungary which permits the calves of reactors to nurse healthy cows or if necessary their dams. At weaning time all calves are carefully tested and the non-reactors are placed in the healthy herd. This plan has been very successful in eight Domaines in Hungary and the quarantine herd at the Iowa Experiment Station was handled according to this scheme. Of the 16 calves dropped by the cows in quarantine only 3 reacted.

2. Ostertag's Method: This provides for a careful bacteriological examination of the milk and other secretions twice each year. The animals with open lesions (spreaders) are removed and the calves are fed on either pasteurized or healthy milk. The calves are tested as under the preceding plan. This plan is being more generally adopted in Prussia and is leading to a gradual decrease in the disease. Eradication by this method, however, could hardly be expected.

Apparently the most urgent need for comprehensive work at the present time is along the lines of tuberculosis suppression.

HOG CHOLERA: The crest of the last hog cholera wave was reached in 1913 when the losses in Iowa amounted to about 28 millions of dollars. The disease reached its maximum in about 2 years and we enter the year 1916 with less hog cholera probably than any time during the last 5 years.

The tendency on the part of many to discontinue immunization as soon as the immediate danger is over is well shown by the great decrease in the application of serum as soon as the disease had receded. The great need now is an organization which will immediately urge the immunization of exposed herds and the cleaning up of infected premises. No organization is available in the state which can successfully combat this disease which does not contain a large percentage of the owners of herds, also the practicing veterinarians. Eradication which would be the ideal is entirely out of reach of our present organization and facilities. We must put every available factor to use in an effort to prevent another extensive, statewide outbreak.

As regards the results from the use of serum the following figures indicate what may be expected under the average Iowa conditions:

SICK HERDS			
	No. treated	% sick	% died
Serum alone.....	19,613	42.7	29.1
Serum simultaneous.....	61,164	16.1	11.2
HEALTHY HERDS			
	No. treated	% died	
Serum alone.....	7,975	1.8	
Serum simultaneous.....	134,735	2.2	

Summarizing all the reports we have 223,487 animals of which 08.15% were reported sick when treated and 07.10% died after treatment. It must be concluded therefore that hog cholera serum is the only efficient agent known at present that can and will be used voluntarily by the swine producers as a preventive against hog cholera and therefore must be principally relied upon in attempts to control the disease in the future.

While there are some who attempt to have it appear that hog cholera has simply been following its natural tendency, uninfluenced by the efforts of the supporters of the use of serum, it is nevertheless significant that during 1913 the disease spread rapidly, quite largely due to a shortage of serum which, under such conditions, is usually applied in sick herds, while in 1914 there was ample serum and 59,852,175 c.c. were used in Iowa alone and the losses were reduced about two-thirds. During 1915 about 29,529,054 c.c. of serum were used in this state and the disease has been steadily declining.

FOOT-AND-MOUTH DISEASE: The chief of the Bureau reports that "the source of the outbreak, which started near Niles, Michigan, has never been definitely determined, and actual proof will probably never be obtained, although the infection was undoubtedly introduced in some way from abroad."

Your committee does not feel that it is necessary to enter into details in regard to the eradication work. The extent of the outbreak may be judged, however, by the fact that up to June 30, 1915, animals appraised to the value of \$5,243,138.55 had been slaughtered. Cost of disposing of the carcasses was \$156,049.22 and during the process of disinfection, property to the value of \$22,158.51 was destroyed. In addition to the above the disease reappeared in Aug

ust due to infected hog cholera serum. As a result of this last outbreak it was necessary to destroy about 400 additional herds, mostly in Illinois. On the whole 23 states were involved. At present two counties in Illinois represent the sum total of the quarantined area.

INFECTIOUS ABORTION: The significance of this disease in the minds of breeders of fine stock may be appreciated from the remark of a prominent dairyman that "the control of contagious abortion would mean more to us than the control of tuberculosis."

Infectious abortion of cattle is becoming more prevalent and not seldom valuable breeding lines are discontinued and the animals sent to slaughter on account of being infected. The name of the disease does not represent all the possibilities and results in infected pregnant animals. In addition to abortion we have premature births and retention of the foetal membranes in many animals. Further complications may be white scours among the calves that are not lost at birth, and sterility of the dams.

The abortion bacillus may be spread to other animals by the exudate which is given off by aborting cows before as well as after parturition. The opinion that infection took place per vaginam by infected straw and discharges, which has been quite generally accepted heretofore is now doubted by M'Fadyean and Stockman as well as by Zwick and Zeller. The former investigators demonstrated that infection is more certain by ingestion than by introducing the organisms into the vagina. Infection through the digestive tract therefore should be given the first consideration.

The bull may spread the disease in a mechanical way by copulation. He may harbor abortion bacilli for a long period of time without showing symptoms of disease and still transmit the disease on copulation.

The significance of milk in the spread of the disease requires further investigation. One of the questions is whether calves become thus infected and later become aborters or whether they develop an immunity.

A most important consideration in this disease is an early unmistakable diagnosis. Clinical symptoms are not dependable. In demonstrating the abortion bacillus we are confronted with the fact that it has no sufficiently specific characteristics as regards morphology and staining and the making of cultures is not practical. M'Fadyean and Stockman attempted a rapid and certain diagnosis

with an agent prepared after methods used in producing tuberculin and mallein. This so-called "Abortin" was said to give a temperature reaction in 4 to 14 hours following a hypodermic injection of one-half to one cubic centimeter. Further investigations demonstrated its unreliability. The ophthalmo reaction was tested with like results. Diagnosis of infectious abortion with abortin therefore leaves much to be desired.

Authorities are well agreed on the value of the agglutination and complement fixation tests in diagnosing this disease. According to Grimstedt, M'Fadyean, Stockman, Wall, Holth, Zwick and Zeller, Belfants, Stazzi, Reisinger, Muller, Hardenberg, Schumann and others an existing or previous infection with abortion bacillus may be determined by means of the agglutination and complement fixation methods. Even these tests, however, indicate simply that the serum came from an animal in an infected herd and that it is or was infected. They do not reveal anything concerning an existing pregnancy or whether the animal will abort. The precipitation method does not give uniform results.

Recent experiments indicate that while abortion and contagious vaginitis frequently co-exist in herds the identity of their etiology cannot be accepted.

The control of infectious abortion in the light of our present knowledge must be along the lines of preventing its introduction into and spread among a herd. Isolation and disinfection are therefore the chief measures to be relied upon. Serological examinations should be made of all animals intended for introduction into healthy herds. A difference of opinion exists as regards compulsory notification of the presence of the disease. Control is further embarrassed by the question as to when an animal may be considered as recovered. Education would seem preferable to sanitary police measures.

Immunization seemed hopeful from the fact that animals that had aborted from one to several times afterward retained the foetus in a normal manner.

Passive immunization on account of its short duration and great expense was not found practical and therefore active immunization was attempted by various methods. Bang of Denmark, M'Fadyean and Stockman of England conducted valuable experiments along this line. The Imperial Board of Health of Germany conducted experiments with 4,599 animals of which 2,442 received different kinds of vaccine.

These experiments were conducted under practical conditions, the animals being kept under ordinary farm conditions. No decisive results followed the use of immunization agents such as serum, living cultures, or killed cultures. This much may be said, however, that a readily apparent decrease in the number of abortions did not take place, as on the average 15.83% of the treated animals aborted, while 18.13% of the control animals aborted. The use of living cultures give greatest promise as only 8.01% aborted following their use. Sir Stewart Stockman reports even more encouraging results from living cultures, the percentage of abortions following vaccination being 6.5 as compared with 38 in control animals.

FORAGE POISONING: Information regarding the condition commonly called forage poisoning or cerebro-spinal meningitis is very unsatisfactory. Experiments carried out by the Bureau of Animal Industry were indefinite. The feed was reported as mouldy but feeding it to experimental animals did not reproduce the disease. Blood inoculations were also negative. Some cases investigated by our research department revealed the presence of an organism probably belonging to the bipolar group, which was difficult to isolate and which was found to be pathogenic on inoculation. That mouldy silage and to a certain extent other foods are fatal to horses there can be no question but the exact nature of the disease producing agent contained in such foods has not been established. Some cases occurring on pasture and occasionally also in stables where no definitely spoiled condition of the food can be established point toward a variety of causes of similar symptoms or one cause existing in a variety of food-stuffs. No more than the average number of cases have been reported during the past year.

ANIMAL PARASITES:—The large number of inquiries received by the veterinary division indicate the increasing prevalence of parasites among our domesticated animals and also that either many stockmen do not consult their veterinarian in regard to parasites or the average veterinarian does not pay sufficient attention to this branch of his practice. In this report we wish to call attention especially to the increasing prevalence of sclerostomiasis among horses and the favorable results obtained from the use of atoxyl which was first used at the Iowa State College after noting the beneficial results obtained by Bockberg and Dorn.

Generally speaking no agent is absolutely specific for certain species of nematode worms. A generous diet is one of the most essential parts of the treatment. Periodic doses of anthelmintic medicine should be given at intervals where animals are known to be exposed. This is more successful in serious outbreaks due to strongylidae than the curative treatment.

The injection intravenously of sterile solutions of atoxyl in 4 to 12 grain doses followed by tartar emetic per oreum in most cases leads to marked improvement and at present seems the most successful treatment we have.

SUMMARY.

Hemorrhagic septicemia is being more frequently reported. Prevention is along lines of isolation, disinfection and immunization.

Tuberculosis is spreading quite rapidly especially among hogs and deserves federal and state attention.

Hog cholera has decreased rapidly in the last two years but an organization should be perfected to prevent extensive outbreaks in the future.

Foot-and-mouth disease has been practically eradicated at a cost exceeding six millions of dollars which, however, is small when we consider that one infectious disease among hogs produced twenty-eight millions of dollars in losses in Iowa alone.

Infectious abortion is next to tuberculosis producing the greatest losses to the live stock industry. Prevention is along sanitary lines but the use of living cultures for vaccination purposes is giving encouraging results.

Forage poisoning continues about the same as regards frequency. Little definite information is available regarding the specific cause, consequently no new treatments can be suggested.

Animal parasites continue to produce heavy losses. Of chief significance is sclerostomiasis of horses for which atoxyl intravenously and tartar emetic per oreum seem to be the most satisfactory treatment.

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NOTES ON A LITTLE-KNOWN RABBIT EAR MITE*

(*Psoroptes cuniculi* Mégnin)

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On April 8, 1915, a gray male rabbit, which was one of twenty-two being used for experimental purposes, was reported to Dr. F. H. Chittenden, in charge of truck crop and stored product insect investigations, as manifesting signs of sickness. Dr. Chittenden, after verifying the report and convincing himself that something was radically wrong with the rabbit, requested the writer to ascertain as far as possible the nature of the ailment. A superficial examination disclosed the following symptoms: loss of appetite with a subsequent loss in weight, mental stupidity, difficult breathing, lack of physical vitality with a partial paralysis of the fore-limbs and neck, lopping of ears and general lethargic condition. It is significant that this particular rabbit should have been the first to show signs of disease, as he was known to be extraordinarily active and the first to see and avoid danger as well as to attack an enemy. His exceptional speed and courage, had, indeed, made him the terror of all the remaining males, not only was this rabbit a monarch over all the others, but his pugnacious disposition led him to attack his attendant on several occasions inflicting slight wounds and tearing holes in the legs of his trousers. Physically, when in a normal condition, he was a splendid type of rabbit, possessing a large, broad head with large, clear eyes and thick, heavy-set ears, rounded shoulders, powerful legs, in fact, a generally symmetrical form, typifying strength, speed, and endurance.

Owing to these qualities the writer is of the opinion that no other rabbit in the lot could have survived this disease for the same period, but would have succumbed in a very short time.

The first examination led to a diagnosis of pneumonia. Castor-oil was administered through the oesophagus and a little Epsom salts kept in the drinking water. The rabbit was immediately segregated and given plenty of succulent green food. Three hours later his condition was noticeably worse. A rigid examination for further complications was made and the disease in question, somewhat commonly known as rabbit ear mange, was disclosed in the right ear.

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This disease is caused by a mite, determined by Mr. Banks as *Psoroptes cuniculi* Mégnin, and has not hitherto been formally recorded in America, although Mr. Banks has a note on its having been collected in the ears of rabbits by Mr. H. E. Ewing, February 4, 1907, at Urbana, Ill. A still later publication on the mites of Illinois by Mr. Ewing failed to mention the occurrence of this mite in Illinois. In fact, great difficulty was experienced in securing references, and with the exception of one* no economic record was found. In the publication quoted descriptions of all stages and the life history is given, thus obviating the necessity of further mention in the present article. It may be well, however, to mention that Mégnin calls this mite *Psoroptes du lapin*, *Psoroptes longirostris* var. *cuniculi*, but Mr. Banks regards *cuniculi* as a distinct species rather than a variety of *longirostris*.

The right ear was filled with waste organic matter which completely stopped up the external auditory meatus while the left ear was only slightly affected, with practically no waste material present. All stages of *Psoroptes cuniculi* were present in this waste material which seemed to emanate from the interior of the ear and slowly work outward. This copious supply of organic tissue waste undoubtedly favors the development and when once the mites gain a footing their progeny increases at a prodigious rate. The eggs are laid singly on the surface of waste material. After cleansing both ears, the writer bathed the skin thoroughly with 2% carbolic acid (phenol) and applied a thick coating of vaseline. On the following morning the rabbit appeared about the same, still refusing both food and water, not being tempted by the most succulent greens. His right ear contained more semi-opaque waxy material which was removed and again thoroughly washed with 2% carbolic acid and subsequently treated with mercurial ointment instead of vaseline. Attempts were made on three occasions to infect normal rabbits by introducing the fresh organic matter harboring numerous living mites into their ears. The infected matter was held in place by a wad of cotton forced as far as possible into the ear passage. All three attempts were unsuccessful, the rabbit removing the cotton in each instance with the aid of his front feet.

The following morning the sick rabbit continued to refuse food and showed no signs of recovery. The case was then referred

*Parasites et Maladies Parasitaires. P. Mégnin, 1880, pp. 191, 193.

for further investigation, to Dr. A. R. Ward of the Pathological Division, Bureau of Animal Industry, who assigned the case to Dr. J. S. Buckley. From a superficial examination, Dr. Buckley stated that he rather suspected paralysis of the digestive organs. As far as he could ascertain at that time breathing and heart action were about normal. Upon his suggestion the writer injected about 20 c.c. of diluted glycerine into the rectum to relieve constipation. Five minutes later the purgative was rejected without even a change in coloration and without the slightest odor. Following this, Dr. Buckley advised a small dose of nux vomica, to stimulate heart action and as a tonic. Almost immediately after receiving the dose the rabbit rallied somewhat, but only temporarily, for one hour later his spirits had assumed their previous condition. From this time on the rabbit manifested acute attacks of paralysis in the neck and fore limbs, which convinced the writer that his condition was such as not to justify further treatment. The rabbit died during the night of April 11, 1915, and Dr. Buckley performed a necropsy the following Monday morning, April 12, which verified his former diagnosis.

All organs, from a superficial examination were apparently normal, except the bladder, which was greatly distended with urine. This latter trouble, according to Dr. Buckley is generally a symptom of a disturbed brain and is exceedingly common in rabies, in fact, it is a usual finding in fatal cases. His conclusion logically sums up the case as one where the brain had been materially disturbed with the natural sequence of paralysis of all closely associated organs. Dr. Buckley removed a small portion of the skull containing the base of the right ear and a portion of the brain intact (see Fig. 2). After careful examination under a microscope, the writer was able to find at least six living mites in a mass of foreign material at the base of the ear, which was less than five millimeters from the brain.

April 12, 1915, a large male white rabbit (Fig.1) that had been removed six months previously to another rabbitry, was reported to be acting in a very similar manner to the rabbit just described. Examination disclosed the same parasite, *Psoroptes cuniculi*, working parasitically in both ears. The ears were slightly swollen and when touched even gently, the rabbit plainly resented it by drawing away, and shaking his head, whereas formerly he invariably manifested a desire for being stroked. All symptoms in this case were present as



Fig. 1—Rabbit affected by *Psoroptes cuniculi* Mégnin. Died three days later. Original.



Fig. 2—Section of rabbit skull, showing basal cavity of ear, in middle of which are numerous mites, crawling over mass of waste material, composed of wax, skin, dead mites, hair, cast skins, and blood. Original. Highly magnified.



Fig. 3—Check rabbit: A brother of rabbit shown in Fig. 1. Original.

in the gray rabbit previously considered, and the disease was considered too far advanced to warrant treatment with an ultimate view of saving the animal. Three days later the rabbit died, and a necropsy performed by Dr. Buckley, gave the same results as did the necropsy in the first case. Figure 1 gives a characteristic pose of a rabbit affected with *Psoroptes cuniculi*, while Fig. 3 shows a brother of the rabbit in Fig. 1, and illustrates a normal rabbit in his characteristic, alert, and animated pose.

This second diseased rabbit, like the gray one, was a self-constituted leader of the others, always first to give the alarm, and possessed superior strength and pugnacity. Indeed the two having about the same weight had by accident been liberated in the same runway and were found in an exhausted condition from fighting, neither rabbit having been severely injured.

In regard to the two mite-infested rabbits, it is not a little singular that both were the strongest rabbits, as stated above, and that when of the same weight they fought to a finish without either being injured, the gray being the aggressor and the white successfully warding off attack. The weaker rabbits, all of which were examined, showed no signs of mite attack. There is a possibility of either having been infected first, but presumably it was the white one, because his mother had an affliction of the ear which was casually pronounced cancer but which might have originated in mite infection. During the quarrel of the two rabbits some mites might have been transferred from the white to the gray, since the white one showed more or less inflamed ears and shaking of the head for at least six months before discovery of the infection of the ears.

Probably many cases similar to the two just described exist today in the United States among rabbit fanciers, but as these animals seldom bring remunerative prices, epizootics of various kinds are altogether too frequently neglected. The writer is of the opinion that this parasite can be greatly curtailed and perhaps entirely subjugated with a little concerted effort on the part of the fancier, if it is not permitted to go too far unnoticed.

In connection with the above species of mite, the writer desires to mention here another European mite, determined by Mr. Banks as *Listrophorus gibbus* Pasquest, and found by Mr. W. H. White, in the hair of a white rabbit kept in an adjacent pen to the gray one previously discussed. According to Mr. Banks, this is the first record he has of the occurrence of this mite in America.

WHITE SCOURS OF SUCKLINGS

HENRY MARSHALL, Richmond, Va.

SYNONYMS: Diarrhea or dysentery of sucklings, calf dysentery, diarrhea neonatorum, infectious diarrhea.

Dysentery of sucklings occurs in new-born animals during the first days of their existence. It is an acute infectious intestinal inflammation characterized by profuse diarrhea and great exhaustion.

HISTORY: The cause of this very dangerous and ravaging disease was unknown until recently. In olden times it was thought to be due to dietetic errors, alterations of the milk, incorrect feeding of the mother, certain climatic conditions, etc. Obich in 1865 was the first to call attention to its infectious nature. Roloff in 1875 proved that it is transmissible from stable to stable. The recent investigations of Peels, Joest, and Jensen have confirmed these findings and brought out much interesting data with special reference to the etiology of the disease.

OCCURRENCE: The disease is usually present in districts where intensive agriculture is practiced, being more prevalent in the spring and fall than in the winter and summer. It usually exists as a stable contagion. Calves are most frequently affected. However, the condition may appear in foals, lambs and pigs, and in rare instances also in puppies and kittens. In some localities it is a very common disease. When this affection and contagious abortion exist in the same stable, as sometimes happens, the rearing of calves is a difficult proposition.

ETIOLOGY: Calf dysentery has been very carefully investigated and the conclusion has been reached that, in most cases, this condition is caused by one or more virulent varieties of the colon bacillus.

The *Bacillus coli communis* appears as a short, comparatively thick, rod-shaped or slightly oval bacterium. It is aerobic, motile, and provided with one or more flagella. It stains uniformly with aqueous solutions of the aniline dyes, but does not stain by Gram's method. It does not form spores. The bacillus grows upon gelatin but does not liquefy it. On agar it grows in the form of gray transparent colonies which later become white. On potato, a thick growth appears of a gray color, changing later to brown. It causes

milk to sour and to coagulate. It produces indol and hydrogen sulphide, as a result of which an unpleasant odor is produced in the culture. In a saccharated culture medium, the bacillus produces an alcoholic fermentation. The colon bacillus is almost always present in the intestinal canal of most animals.

PATHOGENICITY: Colon bacilli obtained from cadavers of calves which died from the effects of calf dysentery exert a severe pathogenic action on new-born calves. If a one-day old calf is given a few cubic centimeters of the bouillon culture of these bacilli mixed with milk, fever and diarrhea will appear on the following day, and the calf will die of white scours in a few days. The same results are obtained from rectal injections of 5 c.c. of such cultures, and at times subcutaneous injections will produce like results. A fatal infection, per os, is more easily produced in calves which have never partaken of any feed than in those in which the stomach and intestines have performed their functions. This is explained by the supposition, that the colon bacilli pass unchanged through the stomach, which has not yet produced any gastric juice, and multiply rapidly in the meconium which is present in the intestines, furthermore the mucous membrane of the intestines is very permeable in such animals, because the epithelium at this time does not possess a well developed mucous layer.

In the intestines of calves which have died of dysentery, colon bacilli are present in great quantities and often in almost pure culture, moreover the bacilli can be found in the organs and in the blood. Colon bacilli obtained from this source agree morphologically with colon bacilli obtained from the feces of healthy calves, however, they differ from the latter by being able to exercise a violent pathogenic effect on calves.

According to Jensen, pathogenic colon bacilli are facultative parasites which enter the digestive tract with the first milk or with other substances, as soiled mucus. Under normal conditions, these multiply moderately in the intestinal tract, are unharmed, since they are not able to attack the mucous membrane of the healthy intestine. If, however, the natural resistance of the tissues is diminished by cold, improper food, certain drugs, etc., then the bacteria pass into the walls of the intestine, later into the more distant organs, and finally into the circulation and thus produce the disease. He considers this lowered natural resistance of great importance, since he succeeded in producing the disease by feeding

substances which had a weakening influence only on the intestinal wall, such as ereolin, pyoktannin, trichloride of iodine, and even boiled milk. Colon bacilli which have acquired virulence in the animal body retain it for that species of animals.

In some cases other bacteria have been demonstrated to be the cause of calf dysentery, as the *Bacillus aerogenes*, paracolony bacillus, and *Bacillus pyocyaneus*.

According to the investigations of Hecker and Baldrey, dysentery of the new-born of other species of domestic animals is probably caused by the same bacteria that produce it in calves.

NATURAL INFECTION: At times the disease appears among the animals in stables, which have been previously free of the disease, and it may appear without the introduction of the disease from outside sources. Such cases usually result from the lessening of the natural resistance of the animal. For example—dietetic errors.

In infected stables the specific contagion exists in the vagina of the cow, in the soil of the stable, or in the bedding; it reaches the external genitals, and the udder of the mother. The calf is usually infected while sucking the soiled udder, or by licking the stable walls, bedding, etc. In rare cases the infection may occur through the umbilical cord. The evacuations of the diseased animals infect the stable and its surroundings, rendering the same dangerous to animals born later.

New-born animals, fed artificially, may become infected by means of contaminated vessels, or hands of attendants.

From Kitt's experiments it appears that intrauterine infection is even possible.

The susceptibility of the new-born to the disease diminishes rapidly as the suckling becomes older. The disease appearing as a rule from 24 to 48 hours after birth. The development of the disease is favored by such predisposing causes as poor nutrition, congenital weakness, and the feeding of boiled milk to the new-born in lieu of colostrum milk. Other predisposing causes are alterations of the mother's milk, due to too high, or too low fat contents, or as a result of feeding the mother oil meals, swill, etc.

PATHOGENESIS: In the intestinal canal of sucklings numerous bacteria wander in the mucous membrane of the small intestines, in the lymph spaces, and lymph follicles. These migrations are easy during the first days of life, because the epithelium at this time lacks the mucous layer, which prevents, to a certain degree,

the penetration of the tissues by the bacteria. The bacteria pass from the intestinal wall to the mesenteric lymph glands, and produce an acute swelling of the latter, later they reach the blood stream and circulate through the entire body.

According to Jensen, calf dysentery is not a simple inflammatory condition of the digestive tract, but an inflammatory process, complicated with a septicemic condition, produced by the entrance of the bacteria into the blood stream. It is also probable, that the symptoms of the disease are produced in part, through the toxic products of the bacteria.

MORBID ANATOMY: The cadaver is greatly emaciated, and anemic. The tail and surrounding parts are soiled with fecal matter. The mucous membrane of the rectum is often protruded. The mucous membrane of the stomach, especially around the pylorus is inflamed, edematous and covered with mucus. The small intestines contain watery fecal matter mixed with mucus and gas, the odor of which is very offensive, while the color is yellowish or dirty gray, occasionally streaked with blood. The intestinal mucous membrane is injected and covered with mucus. The submucous and muscular coats of the intestines are edematous. Similar changes in less degree are also found in the large intestines. The mesenteric lymph glands are always swollen and often contain small extravasations of blood. The parenchymatous organs are pale, due to the general anemia. The spleen is rarely enlarged. An acute edema of the lungs, or a circumscribed pneumonia is occasionally present. The serous membranes especially the pericardium, and endocardium show petechiae. The muscles are flabby, lusterless, and of a muddy red color. As a rule the liver, spleen, and kidneys show no gross alterations. The above described lesions are not well marked in all cases. They may be slight even in cases where the pathogenic bacteria are found in all the organs, and even in the muscles. It is claimed by some that the pathological alterations are dependent upon the cause of the disease, differing from the above when the cause of the disease is bacteria other than the colon bacilli.

SYMPTOMS: The symptoms of white scours are similar in all species. The first symptoms usually appear before the new-born animal is three days old, at times they appear a few hours after birth, and occasionally not until after the 4th or 5th day of the animal's existence. The new-born animal stops sucking, is depressed, standing in one place, or lying upon the ground much of the time.

On the first, or not later than the second day of the disease, a watery diarrhea appears, which possesses a very disagreeable odor, in foals, and pigs the color of the fecal matter is a yellowish brown, in calves, white, and in lambs, yellowish, changing later to a grayish white. At times the fecal discharge is tinged with blood. The tail and adjacent parts are soiled with the discharges. In the beginning of the disease, defecation is accompanied by severe pains, later it is painless, and near the end of the disease it is involuntary. In foals symptoms of colic are frequently observed, as trotting movements, pawing with the front feet, looking at the abdomen, or drawing the feet under the body. Similar symptoms are observed in calves, but in a milder form. The abdomen may be distended, or tucked up. The appetite is lost. After defecation the patient stands with feet placed together, back arched, head drooping, or else it lies motionless upon the ground. Weakness increases rapidly, the eyes sink in their orbits, the cornea loses its lustre, saliva drips from the mouth. The hind legs are spread apart, the hair is harsh, the skin of the extremities is cold and clammy, the body gives off a disagreeable odor. Finally the greatly emaciated animal is exhausted and death ensues.

In the beginning of the disease the body temperature is 2 to 4 degrees Fahrenheit above normal, but with the appearance of weakness the temperature falls, and just before death it is sub-normal. Respiration is superficial, and in the later stages rapid. The pulse is frequent, and weak, and at times scarcely perceptible. In some cases inflammation of the joints develops, also indications of septicemia.

COURSE AND PROGNOSIS. As a rule the disease runs a very rapid course, death may occur on the second day after the appearance of the first symptoms, in exceptional cases it may require 10 days to run its course. The prognosis is very unfavorable. Frequently all of the affected animals perish. The losses are rarely less than eighty per cent. Those that survive often remain weak, or sickly, for a long time. Unfavorable signs are bloody diarrhea, and the rapid falling of the body temperature. The age of the affected animals also has an influence upon the prognosis, being more unfavorable in very young animals. The infection may be retained in a stable for years, the high mortality is partly due to catarrhal pneumonia, which is a frequent complication.

DIAGNOSIS. The diagnosis is usually easy, and is based upon the appearance of the disease shortly after birth, the depressing character of the affection, the intense diarrhea, and the infectious nature of the disorder. It is to be differentiated from simple acute gastro-intestinal catarrh produced by dietetic errors. The latter disease usually appears in older animals, and generally exists in a milder form. Septicemia of new born animals produced by infection through the umbilicus, is distinguished by the diseased condition of the navel, and by the appearance of inflammatory processes of a metastatic nature, especially in the joints.

TREATMENT. Prophylaxis is of the greatest importance. It consists of perfect cleanliness during parturition. This includes cleaning and disinfection of the stable at frequent intervals; an abundance of clean bedding for the parturient animal; cleanliness of the hands of stable attendants, etc.

If the disease has already appeared in the stable, it is advisable to remove the pregnant animal to a clean stable, two or three weeks before she is expected to give birth. It is also advisable to disinfect the litter and vagina of the mother, both before and after parturition. The udder, tail and external genitals of the cow should be thoroughly clean. The new-born animal should be handled in a perfectly clean manner. Its first food should be colostrum, which because of its laxative properties will assist in the passage of the meconium. The young should be kept in moderately warm, clean places free from drafts.

Poels recommends the following method of handling the mother and her offspring to prevent calf dysentery.

The external genitals, the tail and the udder of the mother are washed with a 3% creolin solution. The vagina is irrigated with a solution of corrosive sublimate, one to 5,000, or with copious injections of tepid water. The calf is caught upon a clean sheet, the umbilical cord is ligated close to the abdominal wall, severed and the stump is painted with a 5% solution of potassium permanganate. The mouth of the calf is washed and a closely-woven muzzle applied. As soon as possible the calf should be permitted to suck out the colostrum. However, it is recommended to first draw from each teat a small quantity of milk which should be mixed with a disinfectant or otherwise rendered innocuous and discarded, as the milk near the orifice of the teats may be infected.

The milk may also be drawn into clean vessels and fed to the calf immediately after birth, and again $\frac{1}{2}$ to 1 hour later. The muzzle is removed only during sucking or feeding. By this method, which may also be applied to foals, the disease is said to have been eradicated from many farms where formerly all calves died.

Evers has obtained good results by placing the young calves in a clean box or crate where they are held for 4 or 5 days, in the meantime they are fed with milk obtained from their mothers.

In the treatment of calf dysentery many drugs have been recommended from time to time. After isolation of the affected animal it is important to administer a mild cathartic, castor oil being especially recommended for this purpose. Dose of castor oil for calves and coals is 1 to 2 ounces. After the action of the cathartic, barley water, lime water $\frac{1}{2}$ to 1 pint, linseed tea or other mucilaginous preparation should be administered, combined with opium, chalk or magnesia, if desired. Hertwig's Mixture is recommended. It is composed of Powdered Rhubarb Root 4 grms. or 1 drachm, Magnesium Carbonate 1 gm. or 15 grains, Opium .3 gm. 5 grs. and Camomile tea 100 cc. or 3 oz., to be administered at one time to the calf.

Of the intestinal disinfectants, salicylic acid (5 to 30 grains), naphthalin (15-30 grs.), salol (1-2 drachms), creolin (10-30 minims) also in enémas in 1% solution, enémas of starch flour and laudanum are also useful to relieve the straining.

As an abortive remedy the intravenous injection of collargol is highly recommended. ($\frac{3}{4}$ of a grain to $1\frac{1}{2}$ drachms of $1\frac{1}{2}$ % carbolic solution).

Eggs, wine, strong coffee, or subcutaneous injections of caffeine are useful in combating the weakness.

Dr. Eber of Leipzig has successfully treated a great number of cases with a subcutaneous infusion of a slightly alkaline physiological salt solution. (.8% sodium chloride and .25% sodium carbonate). Two quarts of this solution are injected into the subcutis of the neck with the aid of a canula, rubber tube and funnel. The infusion may be repeated in from 2 to 5 hours if necessary.

The excrements of the affected animals should be destroyed, as they contain the infective agent.

IMMUNIZATION: Since it is recognized that various species of coli bacillus are responsible for this disorder, immunizing sera have been prepared by different investigators for combating the disease.

It has been found that a polyvalent serum is most effective, since various species of the colon organism are associated with the etiology of the disease. In most instances, the results from the use of such serum have been most gratifying. Very satisfactory results having been reported by various practitioners. By its use Jensen succeeded in reducing the mortality in herds on numerous premises where the disease had prevailed in a malignant form from 100% to 0%. These results were obtained without the inauguration of any other protective measures.

Raebiger had only one death among 62 calves treated with such a serum; he also reports 278 inoculations on previously infected premises in which none of the calves have become affected since this treatment has been adopted.

White scour serum is now being commercially prepared in Europe and in America. According to the manufacturers this serum is indicated as a prophylactic in calves coming from herds in which calf dysentery is present. Calves thus exposed should receive 10 to 20 c.c., subcutaneously. Those that become infected soon after birth should immediately receive a hypodermic dose of 10 c.c., to be repeated in several hours, as indicated by the symptoms. For curative purposes for calves suffering from white scours in a more or less severe form, not less than a 20 c.c. dose should be promptly injected to be followed by injections of 10 c.c. of the serum at intervals of 6 to 12 hours, depending upon the symptoms.

It should be remembered that organisms other than the *Bacillus coli communis* may, in occasional instances, be the causative factors in this disease, and that a serum based on immunization with the colon bacillus will not be of value in such cases.

Dr. J. F. Winchester of Lawrence, Mass., has framed a bill to come before the Massachusetts legislature relative to the inspection of cattle so as to provide that any cow placed in quarantine shall not be released until a tuberculin test is given, and that all native cattle sent into the stock yards at Brighton, Watertown and Somerville be tested as foreign cattle or cattle brought in from without the state. Dr. Winchester declares that it is really a pure milk bill and means the further conservation of the lives of human beings, especially children. The bill has been indorsed by the anti-tuberculin league and committees from other important organizations of Lawrence.

CLINICAL AND CASE REPORTS

TRAUMATIC PERICARDITIS WITH COMPLICATIONS AND SURGICAL REMOVAL OF THE CAUSATIVE AGENT

W. F. BURLEIGH, D.V.M., Clemson College, S. C.

That we, as assistants of Nature in her healing art, should at all times have confidence yet not over-confidence in the results of her silent workings, whether suspecting success or failure, was impressively manifested to me while in attendance upon the case herewith described.

In the early part of last June I was called a considerable distance from my office to attend one of a number of valuable cows in a dairy herd in Madison County, N. Y. According to the owner this animal during the three weeks previous had shown symptoms of inappetence followed by loss of condition and a failing milk supply. At the end of the second week a hot and painful swelling about the size of an apple appeared on the left thoracic wall immediately posterior to the point of the elbow. The animal preferred to remain inactive a greater part of the time.

At this time a local practitioner was called who, according to the owner, gave the animal but a cursory examination and pronounced the disease black-leg with recommendation of immediate slaughter. This, however, the owner refused to do, when two or three days later he enlisted the services of another veterinarian (non-graduate) who pronounced the disease acute indigestion and prescribed treatment. No arrangements were made to treat the local swelling.

Upon my arrival a few days later I found that the animal had been removed from the stable and placed in a horse stall where she stood breathing with apparent difficulty and frequently emitting slight groans which were in harmony with the respiratory movements of the chest walls. The left forward leg was extended to accommodate the presence of a swelling of approximately eighteen centimeters in diameter and nine centimeters in depth which was situated on the inferior border of the chest wall immediately posterior to the humero-radial joint of the extended limb. The swelling had the appearance of a large abscess and was hot and painful.

Compelling the animal to move about apparently increased its suffering. Temperature 100.5, respiration 20, pulse 70, not very weak.

Exploration of the interior of the swelling by means of a trocar revealed the presence of a very fetid, dirty brown liquid. After a very guarded prognosis I advised the owner of the necessity of an operation for the purpose of releasing this fluid and exploring the abscess cavity for the possible presence of foreign bodies.

With the animal in the standing position an incision was made about one and one-half inches in length directly over the most prominent portion of the swelling. There at once occurred a discharge of about one pint of very fetid fluid which was immediately followed by a very considerable hemorrhage rather alarming in its proportions.

A digital examination to locate the origin of the hemorrhage revealed the presence of several bone sequestrae from the sternum which were about two centimeters in diameter. These were at once removed and further search revealed an opening through the sternum which directly communicated with the thoracic cavity. While exploring this opening my finger came in contact with the heart, whose movements were very marked. Further investigation revealed a hard object lying in the pericardial sac in close proximity to the apex of the heart and which upon removal proved to be a blackened ten-penny wire nail.

The hemorrhage was now very pronounced, the blood flowing freely in a stream of about one-half inch in diameter. Remarking that the cow would probably die in a very short time I cleansed the abscess cavity with cotton swabs and antiseptic solution and firmly packed the opening with cotton gauze to prevent further hemorrhage, externally at least.

Since the hemorrhage apparently had its origin at some obscure point in the interior I had visions of the blood flow being thus checked to quickly fill in around the heart and clotting there to seriously interfere with its action. This, however, did not occur and I concluded that the gauze exerted sufficient pressure to check the hemorrhage.

At this time the animal was trembling considerably. The respirations and pulse were very rapid, this being due probably in part to excitement.

After administering stimulants and arranging for proper nursing and medication, I left with instructions to be called in the morning if the cow was still alive. I felt confident, however, from her general appearance, that she would not be. It was two days before I heard from the case when the owner called me over the telephone stating that the cow was still alive and seemed to be feeling better.

Upon my arrival I found the animal apparently comfortable, standing quietly, and having a little appetite. The udder was inactive. Temperature 100.5, respirations 30, pulse 60, fairly strong. The gauze pack had come away from the opening of its own accord and a slight discharge of dirty brown fluid was still present. The swelling was somewhat reduced in size and inflammatory intensity.

As this farm was of such a distance from my office that daily attendance upon the animal was economically prohibitory, I decided to allow the owner to treat the local wound and administer medicine orally according to my directions and to inform me from day to day of any changes that he might notice in her condition.

It was nearly three weeks before I again heard from the case when the owner called at my office and informed me that the cow had improved to such an extent that her appetite was nearly normal and the quantity of milk gradually increasing. The surgical wound was yet open from which there was a little fetid discharge. The swelling was largely reduced and the pain apparently completely subsided.

A later history I have unfortunately been unable to secure, yet the ultimate result of this particular case is perhaps immaterial from the view-point of the rough handling that certain of the vital organs may withstand and yet continue at their work. In this case a rather severe local infection was present in the swelling. Certainly a portion of the thoracic cavity must have become contaminated at least where the nail was present.

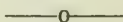
It suggests to me the possibility of favorable results in surgical interference in at least a few of the cases of traumatic pericarditis when the diagnosis is made sufficiently early to avoid the sequelae of marked general systemic disturbances.

“ACUTE LEAD POISONING IN CALVES”

C. J. HOYT, Walden, N. Y.

Two calves, pastured in an orchard adjoining a farmhouse, were seen and fed at 6:00 P. M., and at that time showed nothing unusual. One hour later the owner saw them and noticed the first calf walking unsteadily and the second calf having slight convulsions. These symptoms increased rapidly and I was called. Upon arrival one hour later, I found first calf dead and second calf in a very excitable condition, salivating profusely, sweating, having spasms of the muscles in the head and neck, trembling and throwing itself upon the floor and staggering to its feet. These symptoms increased for twenty minutes, when the calf died.

I diagnosed the cases as acute lead poisoning upon which the owner told me there was no lead in the pasture field. I told him I would return the next morning to hold a post-mortem, and search the pasture for lead. Post-mortem revealed nothing but the pasture revealed a small pool of water which had seeped up from a cess-pool or drain connected with the kitchen sink by 18 feet of lead pipe. One quart of this surface water was obtained, also one quart of liquid from each calf's stomach. The three samples were forwarded to L. J. Cross, chemist at Cornell University, who returned a report saying that all three samples were laden with lead.



“PURPURA HÆMORRHAGICA” IN THE HORSE WITH “ADDENDA” OF ALLIED AFFECTIONS

FRED. C. MAHON, M.R.C.V.S.

One subject was a thirty-year-old bay mare “which had not previously had a day's illness”—according to the owner. Grazing on herbage already invaded by some Army and other animals the mare had suffered severely from strangles—febra-pyogenica—was evidently invaded by the poison, and to such an extent that at one time I feared dissolution. The parotideal swelling, and resultant abscess after blistering and opening of same, took on a bad ulcerative process, the cavity measuring 13 in. in circumference at one time. Throughout the seizure the appetite was never remiss,

and temperature did not exceed 104.3° F. In this case my treatment was by tonics, as acid nitro-hydrochloric dil., liq. ammon. acet., and infusion of gentian in scalded hay, chaff, corn, and bran. In lieu of cantharides, or mercurial blister, I used repeatedly mustard oil, an agent I use extensively.

I gave hypodermically injections of strychnine and electuary of potass. iodidi, belladonna, and glycerine.

As an attack of purpura supervened on the tenth day I had recourse to adrenalin—my sheet-anchor in almost all cases—but if asked to explain why such good results follow in my experience I am afraid I cannot give a precise reply. Whilst writing of adrenalin “and its use in purpura,” etc., let me quote a very able American writer, observer, and clinician (*vide* “Veterinary Materia Medica,” fifth edition, p. 10—Parke, Davis and Co.).

Dr. J. H. King, of the Kansas City Stock Yards, states in “Veterinary Notes” of December, 1908, p. 12, that he finds adrenalin is a reliable means of diagnosing the presence of “heaves” (broken wind, asthma, emphysema of lung tissues). Even though the horse has been drugged with stramonium or other sedative, he says: “I noticed that upon injecting intravenously 30 minims of adrenalin chloride solution in ½ oz. of normal salt solution the breathing became accelerated in about one minute, and if the animal was only slightly affected with the disease it would immediately show the double respiratory act, or double abdominal breathing, accompanied by the usual action of the costal muscles unabated for several minutes. I have used adrenalin chloride as a diagnostic agent for the past three years with the greatest confidence. In order to verify my diagnosis, I have kept track of these cases, and have always found afterwards that I was correct.”

I refer to these notes as it was by accident in using same in Case No. 2 of purpura in another aged mare on the farm where my thirty-year-old “nag-mare” had strangles, followed by purpura and broken wind setting in suddenly, that after the first injection of 90 minims of adrenalin chloride my patient’s breathing became normal, and this condition remained so for thirty-six hours approximately, and with the hemorrhagic infarctions, petechial spottings of the mucous membranes, and edema, the broken wind was again noticeable. This to my mind opens up a serious question as to whether fraud is not possible by injections of horses prior to sale, and particularly if put to the crucial point. Post-mortem results

and chemical analysis would not afford the practitioner or purchaser of a broken-winded horse much satisfaction, if at all.

Briefly, Case 1, a twelve-year-old mare (heavy van), cardiac weakness marked, temperature 98.6° F.; pulse, submaxillary 68 per minute, cardiac 90; both small, weak, intermittent; edema of all four legs, causing animal to remain a fixture in her stall. Head pendulous for two days, and animal stupefied, forcing head into a corner, and remaining in this position for hours. Here adrenalin repeatedly used. Saved this case. In fact, I have only attended her for a week. Value originally knacker's price. To-day worth £20.

Case No. 2.—Thirty-year-old "nag-mare." Here again chief agent used adrenalin. Results marked. Recovery.

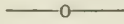
Case No. 3.—Thirty-year-old "cart mare." Purpura and broken wind. Again adrenalin chloride effected wonders, and I attribute recovery entirely to its judicious use.

Case No. 4.—Peculiar from onset. Diagnosis, "lymphangitis." Near hind limb markedly so. Off hind slightly. On third day knuckling over of near hind fetlock. "Dead lame." Shoe removed. No mischief apparent. Soap and iodine liniment, injections twice daily of adrenalin chloride 60 minims, liq. ammon. acet. in drinking water, bran mashes, linseed boiled, also linseed tea. One injection of physostigmine. No drenching. Recovery on tenth day and at exercise. Work in three weeks from seizure. One noticeable feature of this case was a symptom as if the animal had had a paralytic stroke. I believe some clot of blood or clots had formed in the renal vessels at one time, as the urine collected on three occasions showed on examination broken-down urine casts and red blood corpuscles. Here I used thermofuge to the loins, covered with wool blanket, and surcingle well.

How is it that "adrenalin" is so marked in its physiological actions? Summarizing the conditions in which it is used by surgeons scattered throughout the globe, I find mention of it in *post-partum* hæmorrhage, epistaxis, hæmoglobinuria, lumbago, gravis conjunctivitis, laminitis, parturient laminitis, collapse following gun-shot wounds, keratitis, and other ocular diseases, azoturia, chronic hæmorrhagic nephritis, purpura hæmorrhagica, pleural effusions in the dog, and heaves (broken wind), and if one searched closely the pages of veterinary literature no doubt its employment may be noted in scores of other cases. In passing, I wonder if the

sister profession uses it as we veterinarians do. Their records should prove interesting in the extreme.

To my mind it is a potent agent for good, and has revolutionized the treatment of many diseases, so should be glad to have records of its use and cases treated, recorded fully and more ably by the pens of the ready writers of our profession.—*Veterinary Journal*.



THE EYE AS AN INDICATOR OF DISEASE

A. SAPERSTEIN, D.V.M., Spokane, Wash.

The veterinarian, unlike the human practitioner, cannot interview the patient. The veterinarian must diagnose by physical manifestations. Hence to be a good diagnostician, the veterinarian must be a close observer.

Experience and observation teaches us that every possible condition which causes disease produces abnormal reaction in each organ of the body. This reaction varies in degree—be it slight to very severe, the change is there for the trained diagnostician to note.

The more complex and highly organized an organ is, the more sensitive it is to systemic disturbances. Inasmuch as the eye is the only highly organized organ that is located externally, it should therefore be our best indicator. Just as the galvanometer can detect very minute electric currents, so the eye records the slightest disturbance in the animal body. The eye, however, goes one step farther. To the trained observer it indicates what may be the active cause.

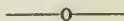
Those of you, who have not paid any attention to the eye as a diagnostic agent will be surprised to note the variations it will undergo in ill-health. The following are some of the changes that have been observed:

The wild look.	The glistening cornea.
The anxious look.	The lusterless cornea.
The dull look.	Temporary partial blindness.
The starry look.	Temporary blindness.
The bulging eyeballs.	Eyes swollen shut.
The sunken eyeballs.	Sclerotic coat may be congested.

Sclerotic coat may be hemorrhagic.	The eyes may be flooded with tears.
Lower eyelids may be edematous.	Pupils may be dilated.
The eyes may discharge mucus or pus.	Pupils may be contracted.
Tear ducts may be occluded.	The eyes may be aching.
The eyes may be affected with parasites.	
Tumors may be found on the conjunctiva and nictitating membrane.	
The conjunctiva may be hemorrhagic.	
The conjunctiva may be in the following state of discoloration:	
1. Yellow; 2. Yellow-pink; 3. Yellow-red; 4. Brown-red;	
5. Blue; 6. Blue-red; 7. Pale or anemic color.	
Intermittent twitching of the conjunctiva.	
Intermittent twitching of the eyelids.	

Various combinations of these physical manifestations may occur.

Very little has been done in classifying diseases as to the changes they produce in the eye. All work along that line has been done only in a general way. However, I hope that these few suggestions will stimulate the veterinary profession to a further classification.



HODGKIN'S DISEASE IN A MULE

CASE.—Mule six years old, gray in colour, very large frame, and had been a large and powerful animal in her prime.

HISTORY GATHERED.—Two years ago, writes a correspondent, she had a bad case of "distemper" (which may mean much or nothing) and had never entirely recovered her former flesh or power since. Then about a year ago she began to lose in weight and ability to do her part of the farm work, and twice in the last year she has had enlargements under her "lower jaw." The first of these enlargements decreased in size for a time, but the last would not decrease. Her appetite was capricious, and she continued to lose in flesh, and when put to work would soon tire and have to be taken out and let rest for a few days.

She was brought to me for diagnosis, prognosis and treatment. I found the submaxillary lymphatic glands to be very much enlarged, from the size of a hickory nut to the size of an orange, and the pectoral lymph glands could be felt to be enlarged, also as well as all of the lymphatic glands that it was possible to palpate. The pulse was rapid, 68; temperature, 104; and respirations, 25. But I thought that some of the disturbances might have been caused

by the long walk that she had in coming to my place—about eighteen miles. She was thin in flesh, hair rough in appearance. When she brayed, the voice was not normal, but more of a shrill nature as though the pharynx was partially occluded.

My diagnosis of her case was Hodgkin's disease, or generalised lymphadenoma, and that the probability of her living a week was very doubtful, that death was sure and certain as the disease was incurable. He wanted her treated, regardless of my prognosis. I began treatment, which consisted of the administration of strychnin and Fowler's solution.

After two days' stay at my barn she got very restless, and finally got down and could not get up without assistance, and the next day she could not stand up after she was assisted to get up. The following day she died. The post-mortem lesions were the most typical I have ever seen. Beginning at the pharynx was a continuous chain of enlarged lymph glands, through the mediastinal glands, the diaphragm, and along the aorta posterior to where the iliac arteries are given off. Then all the lymphatic glands of the intestines, spleen, liver and parietal walls of the abdomen were enlarged from the size of a nut to the size of a football. The sternum and lungs were deeply involved. On palpation, the glands were rather firm and hard, and on section the glands presented a grayish white semi-translucent appearance, broken by intersecting strands of fibrous tissues, and there was no necrosis or caseation of any of the glands.

Her appetite remained only fair until she died. Her bowels and kidneys functionated about as normal.—*Veterinary News*.

Published accounts state that glanders has broken out in a number of horses and mules purchased by the British government and held at the Newport News, Va., stock yards. Dr. Ferneybough, the state veterinarian, states that out of 102 suspects twelve mules and horses have been killed.

It is reported that a number of valuable horses have died in the vicinity of Albion, Mich., through an attack of a peculiar disease which has not been diagnosed.

ABSTRACTS FROM RECENT LITERATURE

UNUSUAL SEQUEL OF CHLOROFORM ANESTHESIA. Henry Taylor. *Veterinary Journal*.—A spaniel bitch, about 5 years old, had a mammary tumor, as often seen in such animals. It was the size of a tangerine orange and the owner wished it removed. Placed on the operating table, the dog being muzzled with a piece of tape, the chloroform was administered by means of a sleeve of thin calico, one end fixed on the dog's head and the other regulated to admit proper amount of air. A sponge wet with chloroform was placed inside. The dog took the anesthetic rather badly, slobbered much and when under the effect and the operation about beginning, it was observed as if it was full of wind, the abdomen being apparently tympanitic. Respiration was labored. The chloroform was stopped and the operation rapidly performed. Taken to the fresh air, the dog came to but the abdomen remained distended and the breathing very difficult. The animal looked very sick and made useless attempts to vomit. Notwithstanding treatment, death took place during the night. Post-mortem: Stomach enormously distended with air or gas, the walls being very thin and on being pricked the organ collapsed as if the muscular elasticity was wanting. No other lesions. The extreme distension with interference of respiration and circulation was the cause of death. A. L.

TREATMENT OF WHITE SCOURS. Dr. Stedefeder. *Berliner Tierarztl. Wochenschrift*, Nr. 23.—It is the opinion of this writer that much importance has been ascribed to certain intestinal infection through bacteria. Therefore the uses of anti-bacterial and certain eradication methods have proven ineffective.

Death from white scours is generally caused by extensive hemorrhages in the intestinal tract. This loss of blood causing an anemic condition in the brain renders the animal unconscious, which if not properly treated results in death.

It is evident that infectious intestinal catarrh is caused by highly virulent bacteria. But owing to the great number of bacteria present in the intestinal tract it is difficult to isolate a specific organism. It is well known that the specific organism must be isolated before an anti-bacterial treatment can become effective.

The writer states that the treatment for this disease should consist of the administration of physiological salt solution, either by subcutaneous injection or per os.

MANSFIELD.

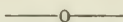
A NEW MODE OF INFECTION IN DISEASES OF CALVES... Dr. H. Jernack, Berlin. *Zeitschr. f. Fleisch und Milchhygiene, Heft 16, 1915.* The above writer has observed that many cases of calf infection occurs through the umbilical opening, and he has noted in four out of six cases of calf diseases that the origin of the infection came from the urachus patens. In each instance there was both purulent and gangrenous condition of the urachus and bladder.

The kidneys were swollen. The internal organs including the liver and umbilical vein showed no pathological changes. The animals were in a bad state of nutrition.

In calves showing severe urethral, bladder and kidney lesions as well as a general infection it may be safely considered that the original seat of infection was the umbilical opening.

In cases of badly nourished calves where the lesions in the organs are absent it is recommended that particular attention be directed to the bladder as well as the general umbilical region for the point of infection.

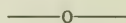
MANSFIELD.



CHICKEN CHOLERA. *The Lancet, No. 4816, Vol. CLXXXIX. No. 25 of Vol. II, 1915. December 18, 1915.*—Dr. J. P. McGowan, assistant superintendent of the laboratory of the Royal College of Physicians of Edinburgh, has published through Messrs. Blackwood and Sons a pamphlet on the Epidemiology and Pathology of Chicken Cholera, together with a Discussion on White Diarrhoea in Chicks. Dr. McGowan describes the research carried out by him on behalf of the Edinburgh and East of Scotland College of Agriculture into chicken cholera and the white diarrhoea of chicks. At certain premises where the intensive system of poultry-rearing was used and eggs were hatched in incubators, some chicks died from white diarrhoea in April. In December an epidemic broke out among the hens characterized by discharge from the nose of a glairy mucus, exudate and ulcers in the mouth. In January these symptoms ceased and were followed by a form of paralysis affecting the legs chiefly, and in many cases this improved in course of time and the birds recovered almost entirely. Examination of the spinal cords of the affected fowls by Dr. J. Dawson, neurological histologist, revealed nothing abnormal. The organism which Dr. McGowan obtained from the lungs and heart in a case of white diarrhoea was identical with the chicken cholera organism, and the occurrence of paralysis and catarrh of the upper air passages is symptomatic

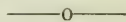
of the tendency of action of the members of the haemorrhagic septicemia group—i. e. to fix on certain localities of the body in certain epidemics. The chicken cholera organism is a saprophyte in soil, manures, and water; it is also present in the air passages and intestines of a large number of apparently healthy fowls. Although it may be present and harmless for long periods, yet a lowered vitality of the bird may cause it at any time to assume a high degree of virulence. The investigator concludes that one outstanding feature of the whole of the haemorrhagic septicaemia organisms (in fowl, sheep, and cattle) is that while they may produce both sporadic and infectious diseases in the adult, they may also cause infectious conditions usually associated with diarrhoea in very young animals. The white diarrhoea of chicks is consequently considered to be caused by the chicken cholera organism, which, like other members of the haemorrhagic septicaemia group, can occasion sporadic cases of the malady at one time and devastating epidemics at another.

REICHEL.



LONG EPILEPTIC FIT IN A PUPPY. Henry Taylor, F.R.C.V.S. *Veterinary Journal*.—A seven weeks old puppy, was covered with lice. Dressed with a preparation looking like lysol, he was taken with a fit in which he remained for no less than six hours. Bromide of potassium failed to act as the dog was unable to swallow. But after the fit had been on for five hours a few drops of methylated ether were injected sub-cutaneously and at the end of the *sixth* hour he was standing and walking about. The twitching of the head, jaws and neck had lasted without interruption for six hours, the dog being unable to stand all that time.

A. L.



THE OPHTHALMIC TEST FOR DIAGNOSING TUBERCULOSIS IN CATTLE. Prof. A. M. Bergman. *Zeitschrift für Infektionskrankheiten der Haustiere*, Vol. 17, Nos. 1 and 2, August, 1915.—1. After the instillation of 40% glycerin solution into the eyes of cattle there occur in isolated cases a watering of the eye and some secretion of mucus, but no secretion of pus; thus no reaction results which would be confused with the conjunctival reaction to tuberculin by tuberculous animals.

2. With glycerin boullion, which is prepared as the medium used in the manufacture of tuberculin and is handled exactly as a tubercle bacillus culture, being concentrated to 1/10 volume, there

is no conjunctival reaction which would be confused with the conjunctival reaction to tuberculin by tuberculous cattle.

3. The tuberculin of the government veterinary bacteriological institute (at Stockholm), a Koch's tuberculin, made up from 92% bovine and 8% human strains and containing 40% glycerin, has proved perfectly suitable for the ophthalmic test. Of 107 animals tested 87 were checked off as tuberculous and 20 as free from the disease. This was done in 38 cases by autopsy and in addition, where it was necessary, by inoculations, and in 69 cases by thermic tests and clinical and bacteriological examinations. Of the tuberculous cattle 70 reacted clearly to the first ophthalmic test, 11 were doubtful and 6 failed to react. Of the 20 sound animals one reacted. The second ophthalmic test in the same eye gave a true and clear result in all cases: 87 reacted, 20 showed no reaction. The ophthalmic tuberculin test is the best fitted for use after a preceding sensitization.

4. At the first tuberculin test a sympathetic reaction was present in the untreated eye of perhaps 4% of the reactors.

5. The sensitizing effect of dropping tuberculin into the eye of tuberculous animals is clearly apparent if the second administration occurred 48 hours later and especially in cases where the reaction was not conclusive after the first administration. When the second administration was made after 13 days the sensitizing effect was equally apparent.

6. The sensitization rendered clearer the reaction to the second test, and it occurred earlier and disappeared more quickly than at the first.

7. To read the test but once is not enough. If a previous test in the eye has not been made, it is desirable to look for the reaction 8, 12, 18, and 24 (possibly also 30) hours after the instillation.

If the eye is sensitized by a previous instillation, one should make examinations after 6, 12 and 18 hours and if several instillations with short intervals between have been made previously, a thing which seldom occurs in practice, then the examination of the reaction may be made at the third and sixth hours.

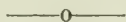
8. The tuberculin treatment of one eye of a tuberculous animal often has a sensitizing effect upon the other eye, which may be recognized by the earlier appearance and disappearance of the reaction in subsequent tests.

9. Repeated tuberculin administrations in the same eye at

intervals of 1 to 3 days has caused in tuberculous cattle after at least four instillations a decrease in the capability of the eyes to react. The reaction begins early, as in sensitized eyes, but disappears very quickly, sometimes indeed 5 hours after the administration. A complete cessation of the sensitiveness to tuberculin did not occur after 8 instillations. By such treatment of one eye the other becomes less sensitive in about the same degree as the one treated. The capability of the eyes of becoming somewhat accustomed to tuberculin may be without practical importance since a reaction occurs even if it lasts only a short time and since, on the other hand, it is evident that the normal capability to react returns several days after the cessation of the instillations. Frequent instillations can not be used for fraudulent purposes.

The conclusions reached by Professor Bergman are in accordance with the results which have been obtained at the University of California. However, as indicated in Bulletin 243 of the California Experiment Station, page 134 and 135, our attempt to use the ophthalmic test in the routine testing of dairy cattle has failed to give satisfactory results under California conditions. We believe that the test has a place in veterinary practice, especially in experimental work and in the testing of especially valuable animals where every means of detecting tuberculosis should be used. In this latter instance we advocate the use of the repeated ophthalmic tests before injecting by the combined intradermal and subcutaneous methods.

C. M. H.



BIOLOGICAL INVESTIGATIONS OF EOSINOPHILIA. Second part: PROPERTIES OF PHAGOCYTOSIS AND ABSORPTION OF VERMINOUS PRODUCTS. M. Weinberg and P. Séguin. *Ann. de l'Inst. Pasteur, Paris, July, 1915, v. 29 (7), pp. 323-346, pls. 6-7.*—Weinberg and Séguin give the following conclusions:

1. The eosinophiles possess phagocytic properties. They engulf inert matter and are capable of destroying in this way not only most of the microbial species, but also protozoa and erythrocytes. However, their phagocytic properties are manifested more distinctly against microbes than against cells.

2. Experiments with *Bacillus subtilis*, *B. coli*, protozoa and erythrocytes show that the eosinophiles are capable not only of engulfing, but also of completely digesting these elements.

3. Phagocytosis takes place *in vitro* as well as *in vivo* (peritoneum, subcutaneous cellular tissue, circulating blood). When the

eosinophiles are very abundant in the blood, or when they have accumulated at the point of penetration by a microbe, they are capable of playing an important role in the immediate protection of the organism against infection.

4. Although the eosinophiles are endowed with indisputable phagocytic properties, they only play the part of the supplementary phagocytes. Their phagocytic properties have in general passed unperceived because, on the one hand, of their exceptional presence in purulent collections, and, on the other hand, of a customary staining technique for microbes which does not permit of differentiating the various sorts of leucocytes.

5. Eosinophiles which have been in contact with hydatid fluid for one hour at 37°C. no longer manifest phagocytic properties, while the other leucocytes (neutrophiles and mononuclears) remain capable of engulfing microbes.

6. Eosinophiles absorb hydatid fluid. This fluid loses its antigen properties after having been in contact for some time with a suitable number of eosinophiles. It is easy to demonstrate this by the fixation reaction, using fresh serum from a case of echinococcosis and comparing the reactions with normal hydatid fluid and with fluid which has been in contact with eosinophiles.

7. The eosinophiles of immunized animals absorb hydatid antigen more easily than eosinophiles from fresh animals.

8. The absorption of the hydatid antigen by the eosinophiles takes place equally well in the incubator or in the refrigerator.

9. In conclusion, the eosinophiles, like the polymorphonuclear neutrophiles, play an important role in immunity. But while the neutrophiles have for their principal function the protection of the organism against microbes, the eosinophiles are especially adapted to the neutralization of certain toxic substances. They show their phagocytic power in the absence, total or partial, of the polymorphonuclear neutrophiles. Similarly the polymorphonuclear neutrophiles may undertake the absorption of the verminous products in the absence of the eosinophiles.

It is probable that having absorbed toxic products, the eosinophiles play a role in the elaboration of specific antibodies, and Weinberg and Séguin are carrying on researches with a view to determining this point,

M. C. HALL,

PYELO-NEPHRITIS IN A COW. W. E. Blackwell, M.R.C.V.S. *Veterinary Record*.—Short horn cow, five months pregnant, presented the following symptoms: suppression of urine, loss of appetite, dullness, disinclination to move, lying down most of the time, passed no feces, during the last eleven days of her sickness. She made frequent and painful attempts to micturate discharging only about half a teacupful of thick blood stained purulent matter. The temperature was 102°, the ears and horns cold, the back arched. The treatment was only palliative. She died after an illness of eleven days. Post-mortem revealed both kidneys enlarged and surrounded by a thick envelope of suet. One of them weighed 12½ pounds. The other only 10. This one was more advanced in disease. Unfortunately the bladder was not examined. It might have shown lesions of cystitis.

A. L.

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PECULIAR FRACTURE. Lieut. A. Hoskins, A.V.C. Lame, aged light draught horse had on the outside of the leg, a few inches below the elbow a slight swelling. It was soft and tender to the touch. Fomentations were prescribed but the lameness kept increasing. Evidently an abscess was forming. It was lanced and creamy pus escaped. The following day on examination, there was observed a displacement in the bone and a discharge of synovia from the wound. No crepitation was detected. The animal was destroyed. On autopsy, there was found a fracture of the top of the radius, into six pieces with suppuration of the joint. Inquiry about the horse showed that he had been kicked several days before but the case did not appear serious, the lameness not having shown itself until some fourteen days after the kick had been received.

A. L.

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ACTIVE IMMUNIZATION TO GLANDERS. A. Marxer. *Archiv f. wissenschaftliche u. praktische Tierheilkunde*, Vol 41, pp. 272-285, 1915.—The author discusses previous attempts at immunization to glanders, and the reasons for the failures. Among these is the fact that the glanders bacillus has singular properties, for example, localized infections will sometimes heal without conferring any real immunity upon the previously infected animal. Previous attempts failed probably because the bacilli lost all their antigenic properties during the killing processes. In the preparation of glanders vaccine, Levy, Blumenthal and Marxer used solutions of chemically indifferent substances, which through their osmotic action brought about an attenuation of the glanders bacilli, with-

out causing any deep seated change which diminished their antigenic properties. For this purpose glycerine and urea were used.

The method of killing is varied, according to the amount of bacilli in suspension. Bacilli at a concentration of 0.1 gram of bacilli in 4 c.c. of 80 per cent glycerin are killed in 14 hours at 37 degrees; at a concentration of 0.004 gram of bacilli in 4 c.c., they are killed in 7½ hours. The above mentioned investigators used such glycerin attenuated glanders bacilli in their experiments on guinea pigs. Best results were obtained when the immunizing dose was injected subcutaneously. A single injection of even small amounts of the dead bacilli was a certain protection against the subsequent infection. Similarly good results were obtained on horses when these received two injections of the glycerinized bacilli, either subcutaneously or intravenously. Each of two horses received 0.1 gram, and three weeks later, 0.2 gram of dead bacilli intravenously; a third horse received a first dose of 0.2 gram subcutaneously and about a month later, double this dose. A fourth horse received 0.1 gram, and three weeks later 0.25 gram subcutaneously. All of these horses were found to be immune when tested against virulent glanders bacilli.

Similar results were obtained by Levy, Blumenthal and Marxer, with glanders bacilli killed in urea solutions. The use of the urea solution has this advantage, that the attenuating action of the solution can be stopped at any desired time, by evaporating the solution at low temperature in vacuo, down to dryness. The powder so obtained is a convenient form of preserving the attenuated bacilli. On the other hand, in order to prevent further attenuation in the glycerine suspensions, it is necessary to add water and keep the mixture cool. This method is not convenient for practical purposes. The urea vaccine may be used in the tropics.

Glanders bacilli, at a concentration of 0.1 gram of bacilli in 4 c.c. 10 per cent urea solution are surely destroyed by 17 hours' shaking at 37 degrees. Guinea pigs were immunized with powdered bacilli or with extract powder. This latter was prepared by centrifuging the bacillary emulsion in the urea solution; the perfectly clear supernatant fluid was evaporated to dryness and rubbed to a powder. The bacilli powder was prepared in a similar manner.

Horses were immunized with urea attenuated glanders bacilli, using 600 milligrams at one treatment or 300 mgs. at two treatments. The protective action was still present after a year's time. There is no temperature reaction after the injection.

Marxer prepared some of his glanders vaccine "Farase" for Professor Dediulin's laboratory in Charkow. This vaccine consisted of glanders bacilli killed by urea. It was tried by Bautz and Machodin on guinea pigs and on twelve horses, two of which horses were controls. The results were in general very good. Some difficulty was experienced with the determination of the minimal lethal dose of the glanders virus for guinea pigs. The horses received two injections of vaccine, three weeks apart. The virus was injected 45 days after the second vaccine injection.

Following these experiments, Dediulin tried the Farase on a large number of horses, over 1000, of very mixed breeds and origin.

One year and four months after the vaccination with Farase, not a single case of glanders occurred among the immunized animals, although in the same locality (Karl-Gute, in Poltava) 14 glanders reactors had to be destroyed. These animals were all allowed to run together. A number of the immunized horses were tested with mallein and reacted negatively.

Four years have elapsed since the vaccination with Farase, and Dediulin states that not a single case of glanders has occurred, although occasional cases occur among non-immunized animals.

From these successful results by Dediulin on a large scale, it is concluded that the glanders immunization by the method of Levy, Blumenthal and Marxer has great practical value and should find widespread application.

Note by Abstractor.—The use of three separate agents to kill the bacilli, though very ingenious, is not new. Marxer, in the above paper, describes the attenuation of glanders bacilli by shaking for 17 hours at 37 degrees, an emulsion of the bacilli in 10 per cent urea solution. In this case the death of the bacilli is caused by the combined action of shaking, mild heat, and osmotic action.

Several years ago a controversy arose over the question of the harmful action of sodium benzoate in foods, especially tomato ketchup. Certain manufacturers A, prepared ketchup with sodium benzoate. Their rival, B, did not use this preservative and extensively advertised the fact that no preservatives were used in their ketchup. But according to A, B's ketchup was effectively preserved by the use of excessive amounts of vinegar (acetic acid), oil of cloves (eugenol) and other spices, and sugar. If used in proper amounts food may be preserved by either vinegar, spices, or sugar. According to A, no one of these was present in sufficient amounts in B's ketchup to warrant the statement that it contained a preservative, i.e., one preservative. But the combined action of the three prevented the growth of microorganisms.

BERG,

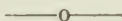
INTERNAL HEMORRHAGE AS A COMPLICATION OF PROLAPSUS UTERI. Mr. Brissot. *Bulletin de la Soc. Centrale.*—*First observation.* The writer was called to attend a cow reported having prolapsus of the uterus. She was lying down, her respiration was accelerated, and she was very restless. The protruding organ had an enormous size, there was no congestion, but its appearance that of a heavy bag filled with liquid. It gave a noise and the feeling of undulations when it was displaced and pressed on its surface.

Fearing a serious complication, more minute examination was made and then it was observed that the visible mucous membranes were pale and bloodless, the pulse could not be felt, the horns, skin and ears were cold, the respiration very accelerated, all the symptoms of internal hemorrhage were present, of which the condition of the prolapsus and its fullness were evident proofs. The cow died almost immediately. Tapping of the uterus gave escape to 15 or 20 liters of red blood. Puncture of the abdomen gave exit to what remained in the animal.

Second Observation. A mare was affected with the same complaint, prolapsus uteri. She was rather old, a very nervous animal, and she exhibited great pain. The uterus was enormous and much congested. Held up on a sheet by two assistants, cold water was freely poured over it and reduction by pressure of bandage (the Coculet method) reduction began. While proceeding in the manipulations, it was observed that a certain quantity of fluid, moved in the uterus, as in the preceding case, suspicion of a similar complication was entertained. The mare died during the manipulation.

Post-mortem: the abdominal cavity was found full of blood. On the peritoneal wall of the uterus there was a large ecchymotic spot, surrounding a laceration of the serous and muscular coats, in the middle of which was widely open an utero-ovarian vein. While this was empty and bloodless, its congener of the opposite side was full, dilated and flexuous. The mare had died by the rupture of a large varicose vein.

A. L.



BIOCHEMICAL COMPARISONS BETWEEN MATURE BEEF AND IMMATURE VEAL. William N. Berg. *Jour. Agricultural Research*, Vol. V, pp. 667-711, 1916.—An extended research in which 41 calves, all seven days old or less, when killed, were used. The work may be divided into three parts: (1) chemical analysis bearing on the chemical composition of immature veal: (2) artificial digestion

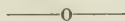
experiments *in vitro* bearing on its digestibility and (3) feeding experiments using cats as subjects. Portions of ordinary lean beef steak were purchased in a market for use as controls in (1) and (2). The meat of a calf less than three weeks old when killed, is generally regarded as immature.

During the study of the chemical composition of mature beef and of immature veal, no differences between them that are physiologically significant were detected, although large numbers of analyses of a detailed character were made. The claim that immature veal (bob veal) is more watery than beef finds little support in the data obtained. The average water content of beef was (in round numbers) 74 per cent; of immature veal, 77 per cent. The difference of 3 per cent is not regarded as important. The total nitrogen and the various forms in which it is present, was the same for both. Adding the water to the total protein (total nitrogen multiplied by 6.25) 96 per cent of the beef and the veal were alike, the remaining 4 per cent, consisting largely of fat, were not studied.

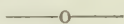
In a large number of digestion experiments carried out in glass vessels, immature veal digested as fast as mature beef. The speed of digestion was measured by three different methods. At present, it is not possible to measure speed of digestion in the body, hence methods have been developed for making this measurement outside of the alimentary tract, and valuable data can be obtained. Both pepsin and trypsin were used in the digestion. The amounts of the enzymes were varied over a wide range. So small amounts as 0.1 or even 0.01 milligram of pepsin digested beef and veal with equal speed. A few experiments were made in which milk was compared with the veal. Of course, milk proteins, being in solution at the beginning, digested faster than the veal.

Cats chosen at random, were fed on a diet in which immature veal was the sole source of nitrogen. The young animals grew normally on the diet; the older ones became fat. A pair of cats, after living two-thirds of a year on the diet, produced a litter of healthy young kittens, which after the nursing period, continued on the immature veal diet with excellent growth. These experiments on cats covering a long period of their natural lifetime, are very significant. They show that (1) immature veal contains all the amino acids essential to maintenance, growth and reproduction: (2) there were no toxic substances present. The cats (altogether there were 9) were exceptionally fine in their appearance and general behavior.

The work indicates that immature veal, when properly prepared, is fit for human food, especially when its deficiencies in fat and possibly in small amounts of undetermined constituents are counterbalanced in the ordinary mixed diet. BERG.



INTESTINAL OBSTRUCTION WITH PERITONITIS, DUE TO HEMORRHAGE IN THE FLOATING COLON OF A HORSE. Veterinary Major F. Pagnan. *Bulletin de la Soc. Centrale*,—An eleven year old gelding was taken with colic. He had the symptoms of intestinal obstruction indicated by uneasiness, restlessness, intermittent pain and dull colic. He moved with pain, looked at his flank. His appetite was gone. He laid down with hesitation and groaned slightly. Abdominal percussion and rectal examination were negative. He had no tympanitis and had passed no feces. The treatment consisted in friction, warm blanketing, saline purgatives, pilocarpine. No result was obtained. After three days of sickness death took place. The post-mortem was interesting because of the intestinal obstruction. The digestive apparatus was empty except the stomach and small intestines which were distended and contained liquids mixed with a small quantity of alimentary matter. The floating colon showed in one meter of its length, an abundant hemorrhage between its mucous membrane and the muscular coat. Clots of blood had pushed the mucosa inward so as to form a complete obstruction. At a few points the mucosa exhibited mortification. Acute peritonitis was the consequence of this alteration of the colon and about 10 litres of fluid were in the abdominal cavity with also floating fibrinous membranes. A. L.



CONTRIBUTION TO THE STUDY OF "ESPONJA" OR SUMMER SORES OF EQUIDAE IN BRAZIL. J. Descazeaux. *Bull. Soc. Centr. de méd. vet., Paris, 1915, v. 91 (19-20), pp. 468-486, figs. 1-3.*

THE PARASITE OF GRANULAR DERMATITIS OF EQUIDAE. A. Raillet and A. Henry. *Bull. Soc. Path. Exot., Paris, 1915, v. 8 (9), pp. 695-704, figs. 1-3.*—Descazeaux has contributed a most important paper to our knowledge of summer sores of horses and closely related animals. Since this disease was first described by Bouley in 1850 as summer sores or granular dermatitis, it has received considerable attention from many workers. Typically the disease is characterized by the presence of ulcerations in the midst of which are caseous or calcareous granulations from the size of a grain of millet to that of a nut. In 1860, Ercolani noted the presence of

larval nematodes in a similar disease characterized by the presence of umbilical crusts. Summer sores, as the name implies, are prevalent in summer and tend to disappear in winter. Descazeaux has given in some detail the clinical and pathological features of the form of this disease which is prevalent in Brazil under the name of "Esponja", the Spanish word for sponge. The most valuable part of his paper, however, deals with the etiological agent of the disease. Ercolani called the worms found by him *Trichina uncinata* and noted that these larval worms resembled the larvae of *Spiroptera megastoma* (now called *Habronema megastoma*) from the stomach of the horse and ass. Buffard, in 1903, studied the larval worms from summer sores and regarded them as the larvae of *Filaria papillosa* (now called *Setaria equina*) from the abdominal cavity of horses, asses, and mules. Rivolta, in 1868, called these worms *Dermofilaria irritans*, and they have been commonly called *Filaria irritans*. Rivolta described the parasite as a worm with a slender tail terminating in an obtuse tip, this tip being armed with very fine spines. Descazeaux has recovered similar worms from cases of "Esponja" in Brazil, and invites attention to the fact that larval worms with tails terminating in spiny tips of the sort found by him and described by Rivolta are not larval filariae in the strict application of the term, but belong in what he calls the suborder Spirurata or the superfamily Spiruroidae (what most helminthologists have regarded as the family Spiruridae of the superfamily Filarioidae). This fact indicates at once that the adults of these larvae are to be sought among the worms of the genus *Habronema*, which are members of the group in question which are parasitic in the horse and its immediate relatives. The three species of *Habronema* parasitic in equines are *Habronema megastoma*, *H. microstoma* and *H. muscae*. Ransom has shown that *H. muscae* develops to its larval stage in the common house fly, *Musca domestica*, the fly becoming infested as a maggot in horse manure. Infestation with the adult worms in the stomach of the horse may take place through the ingestion of such infested flies, or by the escape of the larva from the proboscis of the fly as it feeds on the moist lips of the horse. In view of these facts, Descazeaux surmises that "summer sores" may arise as the result of flies so infested feeding on the moisture on the skin of the horse. But since embryos found in the umbilical crusts belong to the young stage of *Habronema*, the embryo which has just escaped from the egg, he proposes for this the following

hypothesis: Embryos of *Habronema* pass out in the manure of equines, penetrate the soiled skin after the fashion of larval hook-worms, setting up the inflammatory reactions which give rise to "summer sores", and undergo in the skin, as erratic parasites, the development which would normally take place in the fly.

The suggested prophylaxis consists in the removal of the adult worms from the stomach of the horse by the use of such anthelmintics as tartar emetic and arsenic, the destruction of the embryos in the manure and of flies, and the use of clean bedding. As a remedial measure for the established lesions he recommends the application and injection of 2 to 3 percent trypanblue, though he states that the only truly efficacious treatment is the early and complete ablation of the invaded tissue.

The clinical variations in the appearance of the umbilical crusts, parasitic dermatitis, summer sores, bursati sores, esponja, etc. is a function of the stage of development of the young worm, which may be present in the embryonic stage or in the six succeeding larval stages. All of these forms may be collectively designated as cutaneous habronemosis or cutaneous habronemiasis.

The paper by Railliet and Henry is in effect a resumé, emphasizing before a different audience the importance of the work of Descazeaux.

M. C. HALL.

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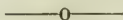
SUB-PERITONEAL EMBRYOMA CAUSING A DIVERTICULUM AND A FATAL OBSTRUCTION OF THE FLOATING COLON IN A MARE. Professor G. Petit and Mr. Houdemer. *Bulletin de la Soc. Centrale*.—One morning a twelve year old mare was dull, depressed, carrying her head down and her back arched. The visible mucosae were injected. Pulse about normal. There was slight tympanitis. The lips of the vulva were swollen, the vaginal mucosa edematous with small ecchymoses. The valve of the meatus urinarius was swollen and looked as if it was torn. The anus was protruding, somewhat relaxed with its mucosa purplish in color.

A few hours after the symptoms changed. Dull colic, constipation, tympanitis were present. The visible mucosae were becoming cyanotic and there was great dyspnea. Intestinal obstruction was diagnosed and death took place in the afternoon of the same day.

At the autopsy the intestines were found dilated with gases. At the convex curvature of the floating colon there was a voluminous tumor, which had by traction given rise to the production of

a diverticulum and an elbow flexure of the intestine with complete closure of the colon and its obstruction. This tumor weighed 4 kilogrammes and 750 grammes, it was irregular on its surface and when cut through showed spots, irregularly distributed on the outside and also in the center of the tumor. The authors considered it as belonging to the variety of embryomas or teratomas.

A. L.



GROWTH IN THE LARYNX, Doct. Luigi Menicagli. *Il Nuovo Ercolani*.—This case occurred in a cow. The tumor was situated on the anterior margin of the left arytenoid cartilage and extended on the internal and external faces. The animal was four years old and suffering with difficulty in breathing after walking a short distance. The difficulty increased gradually and soon the cow manifested severe dyspnea threatening suffocation. The minute examination of the throat, neck and thorax was negative. That of the larynx, made with a speculum in the mouth and a laryngoscope, revealed to the writer the presence of a growth on the arytenoid cartilage which to be removed would probably require laryngo-tracheotomy. This was decided. After careful disinfection and the preparation of the field of operation a tracheotomy tube was inserted. The larynx was exposed and entered, the tumor was seized with a pair of forceps, isolated from its position and attachments on the faces of the cartilage by a careful dissection of the mucous membrane, when finally it was drawn outward where it was extirpated. Abundant hemorrhage followed and stopped with some difficulty by plugging. The tracheotomy tube was removed. The wound was closed with sutures and the animal allowed to get up. Careful diet for a few days was followed by rapid recovery.

A. L.

PROCEEDINGS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

(Continued from page 644)

DR. CAMPBELL: I move to amend that resolution and think that a committee should be appointed leaving the number and selection with the new president. I refer to the resolution in the matter of acquiring the publication.

DR. LYMAN: I rise to a point of order. The point of order is that that was laid on the table until the other motion was taken care of. Therefore, I call for the original recommendation.

PRESIDENT MARSHALL: In my opinion, the original motion should receive attention first.

DR. KINSLEY: Shall we amend that motion? Is not that motion before the house now?

PRESIDENT MARSHALL: There is a motion before the house but how are you going to dispose of the first motion?

DR. KINSLEY: What is the motion before the house

PRESIDENT MARSHALL: The recommendation of the executive committee.

DR. KINSLEY: Cannot that be amended?

PRESIDENT MARSHALL: He did not offer it as an amendment to that motion.

DR. CAMPBELL: I intended to offer it as an amendment to the motion. Is the mover of the original motion in favor of the amendment?

DR. HOSKINS: Dr. Campbell has not stated his amendment.

DR. CAMPBELL: As I understand the motion, it is to accept the recommendation of the executive committee, that is the present executive committee as now constituted, composed of thirteen members from throughout the country to constitute a committee on Journal to organize and establish an efficient publication on the lines of the American Medical Association and to carry it out until other provisions are made for it.

DR. HOSKINS: That is the way I understand it. That the recommendations of the executive committee must either be accepted or rejected and if they are rejected, then we can come back with the motion putting the motion in some other form. That has been the custom of our association for a great number of years.

PRESIDENT MARSHALL: That is my opinion. That you must accept the recommendation of the executive committee or reject it.

DR. HART: Mr. Chairman, I move the report of the executive committee be adopted.

DR. KINSLEY: Is not that the same motion that is before the house now?

PRESIDENT MARSHALL: The motion was already made.

DR. KINSLEY: If that is the ruling, I would like to ask another question. Is it the intention of the executive committee to use the list of the executive committee and officers as presented and published in our program?

DR. HOSKINS: Yes. The publication committee or committee on Journal.

DR. KINSLEY: I say is that committee to be the same as published in our printed program.

DR. LYMAN: As now constituted?

DR. MAYO: As I understand it, Mr. President, it means the executive committee as at present constituted. The question was not discussed particularly in the committee as to that but that is my understanding.

DR. KINSLEY: Mr. President, that being the case, as I recall it, it has been the custom in making the report of the executive committee, that a list of the men constituting that committee, be presented for the information of the association. I do not believe there are many of us here who know who constitutes that committee. Looking over the printed list which appears on the program, I see a number of members listed there who are not present at the meeting and I doubt if they have taken any action with the executive committee. I think it is fair to the organization that we may know who they are.

RR. R. C. MOORE: Mr. President, as a member of the association, I cannot support the recommendations of that committee to continue the present executive committee for the publication committee or committee on Journal because they are too widely separated. I do not believe it is practicable, not that I have a right to say anything against any member of the committee or against their ability, but they are too widely separated. I believe it would not be practicable to conduct a Journal in a proper manner when the men who have charge of the running of it are widely scattered as these men are. I believe as a matter of business, these men should be appointed by the president, for the purpose of running this Journal.

PRESIDENT MARSHALL: I think it would be in order to explain to you who are the present members of this executive committee. I will read them: Dr. Cary, who is chairman of the committee. He is not present. Dr. V. A. Moore has been substituted as chairman in his place. Dr. Lester H. Howard is not present and Dr. Frothingham has been appointed in his place. Dr. Jensen is present. Dr. Dyson is not present and Dr. Stange was elected in his place. Dr. Roberts is present. Dr. S. H. Ward is not present and Dr. Lyman was appointed on the executive committee in his place.

The executive committee as now constituted, consists of the following: Drs. Moore, Frothingham, Jensen, Stange, Lyman, and Roberts, and elected officers of the association. These officers are about to retire.

DR. TYLER: As I understand it, the present motion before the house, provides that the men who are serving at this meeting on the executive committee are to be continued, not those on the present list. It seems to me the association is taking out of the hands of the new president, his inalienable right to appoint committees working under him who are largely responsible to him for their actions. I think the president is entitled to the right to appoint his own committee on publication or Journal, or whatever you call it. He has some rights in the matter.

DR. CAMPBELL: I will now ask if you will entertain an amendment of this motion to adopt the report of the executive committee of this nature, that the reports be referred back to the committee with instructions to change the publication committee, or the committee on Journal to five members appointed by the new president. Will you entertain an amendment of that kind?

PRESIDENT MARSHALL: I will put the proposition to the association and let them decide what they wish to do about it.

DR. HOSKINS: I understand you cannot entertain a motion of that kind. We have either got to reject or approve the recommendation of the executive committee. We must do one thing or the other. If it is not the desire of the members of the association that the present executive committee, as now composed, shall constitute the committee on publication or the committee on Journal, to undertake the work of establishing this Journal, we want to vote against it. If we believe they can best carry out the provision contained in the resolution, then we should approve the recommendation of the committee.

DR. KEANE: It seems to me we are quibbling over some very small details and yet at the same time this is an important thing. If the association decides to adopt this resolution which provides for the publishing of a Journal, it would appear to me, that the first year would be the most critical year in the history of the publication and the men who have been working on this plan, it appears to me also, are the men who ought to have charge of the first year's work. Some objection was made on account of the fact that they cannot get together. There are three on this executive committee at this association today, who are from the east and two from the eastern part of the middle west. I think that is about as close as you can get members of a committee together and at the same time give the whole country representation on the committee. So that is why I am in favor of the executive committee's report as read.

DR. KINSLEY: Mr. President, I rise to a question of information. Does not this resolution carry with it the present officers of this association on that committee? They are scattered from the Gulf of Mexico to Canada and from the Pacific to the Atlantic.

DR. MAYO: Permit me to state, that the members of the executive committee realize that the actual work of running this Journal has got to be done by two or three men and it is their plan to appoint a sub-committee, so situated and we hope, qualified to get this Journal started, but they thought the association ought to be represented back of this small committee by a much larger committee on publication or Journal, which should be pretty well scattered over the nation. The members of which could be reached by mail and not necessarily be called together, in this way they could advise whoever is carrying out this work. That was the idea of the committee.

PRESIDENT MARSHALL: If there are no other remarks, the question is, whether we will accept or reject the recommendation of the executive committee. Those in favor of accepting the recommendation of the executive committee, in regard to the publishing of a Journal, make it manifest by saying, "aye", those opposed, "no". The "ayes" have it; it is so ordered.

DR. MAYO: Mr. President, the committee also recommends that this organization shall be incorporated as the American Veterinary Medical Association.

DR. FOX: I move that the recommendation of the executive committee, that the association be incorporated, be accepted. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL:—Are you ready for the question?

DR. HOSKINS: Mr. President, I trust that resolution will not prevail or at least that it shall not prevail at this meeting. There are so many things to be said about incorporated bodies. We have gone along very well for fifty years and the few little instances that we have had have been insignificant as far as any trouble this association has had is concerned. We have been a body of men governed entirely by the rules of our adoption. The moment we become an incorporated body we become in every sense a legal body and I know that there are some who feel there may be at some time a possible danger of some one of us being sued for large amounts of damages. While this should not have any weight with us, yet you should remember that the moment we become a legal incorporated body, we are far more readily sued and drawn into litigation than we are as we stand today. If we incorporate, then we exercise and hold our rights and privileges under legal restraint which surely has not solved many of the great difficulties under which such bodies labor and I think the moral forces have done more to solve every public question than any legal entanglement and I sincerely trust that if we are really going to be incorporated, we will have at least a year to think it over before we adopt the provision. Incorporation, in my mind, has not a single thing to commend it. I am a member of several clubs, one of them a great force and a great power in our community, and from the fact that it exerts its influences by moral suasion and moral appeal and moral force, we have kept it from being a legal body that might be sued. To dismiss a man by any failure to live up to what we preach or our code of ethics, or our ideals, we will never accomplish by legal measures. Let us remain simply a moral force, bound together because we have certain ideals and are all interested in carrying them out. Let us not invite the legal entanglements that will follow incorporation as it is impossible to get a national incorporation. We must incorporate under the laws of some state and must be responsible to what may be the laws in that certain state governing corporations and we will also be bound by the future laws which may be made. To my mind, we are going into a mass of difficulties, the nature of which no man can foresee. For more than fifty years we have been operating under the present plan of this association which has met every purpose in dealing with every business proposition which we have had to meet and if some of the members have had to give more of their time, more of their money than others, they should remember they came into this association to do all in their power for the best interests of it and for the profession which has been benefited by the progress of this association.

DR. MAYO: Mr. President, the sentiments we have just heard expressed by Dr. Hoskins, of course, we all approve of, but the establishment of a Journal is a business proposition requiring a definite business organization, and no responsible person will be associated with that business organization unless it

is incorporated. You have got to collect money, and in order to do that, we must incorporate. We cannot do it as individuals of this association. It is an absolute necessity if we are going to publish a Journal, there is no question about that at all. You assume no more legal responsibility than your officers do now and while I have signed a note with others for several thousand dollars, one does not like to do it, nevertheless, I am sure the members of this association, if there were such would rally to your support. Yet, at the same time, aside from the fact of personal risk and personal inconvenience we cannot do business unless this association is incorporated, and that is all there is to it. So far as I am personally concerned, I would be just as loyal and will give my hearty support to anything that may come up as anyone else, but I do not think that I would care to be associated with a business proposition of this kind that was not incorporated.

DR. LYMAN: I want to endorse what Dr. Mayo has just said. I don't believe there is a member of our association that would want to become the editor of this Journal without the incorporation of this association. As Dr. Hoskins has said, we have had an association for some fifty odd years, and have run along very smoothly. Perhaps you don't know all the details. It may have seemed to have run very smoothly to some of you who are not behind the scenes. I personally was sued for ten thousand dollars while a member of your association for actions of the association. I think some of you are familiar with that fact and I paid for the defense of this action out of my own pocket. Why should not this association pay the expenses of the association and not shoulder them upon the individuals themselves? I just simply want to endorse what Dr. Mayo has said, I believe we must be incorporated since we are going to conduct an official Journal.

DR. HOSKINS: Mr. Chairman, I am quite familiar with the case Dr. Lyman refers to. It was an insignificant act of an irresponsible man and amounted to nothing. I have been a trustee of this association for five consecutive years. I never had the slightest question asked about where the money was coming from to meet our obligations. It is a fact that when we went to publish the minutes of last year, we didn't have the money with which to do it and some of us were asked to give a note in order to aid the publisher in carrying out his work, which was given. It was not that he had any doubt but that the association would pay. Any publisher will probably charge up an account for you to give you credit for two or three months before you will be asked for money. This association has a good steady income, it is a very definite matter. Now if we incorporate, our president may be involved in litigation and he may have to answer for anything that is published in the proceedings, and he may have to answer in the courts of Washington, or in the courts of Dakota, or he may have to go down and answer in the courts of Texas. I don't want to put any member of this association in that position. I don't want to see this association brought into the field of litigation by which attorneys would have to be retained in the various portions of the country and a great deal of expense would be laid upon the association. If I thought it was absolutely essential to have an active incorporation to publish this Journal, I would be against publishing it rather than to write litigation

all over the land which this incorporation will cause because your officers will have to respond to every suit and we can be sued then as a whole through your officers, where today, we can only be sued as individuals and those financially responsible will be sued. The expenditure of twenty-five dollars in Connecticut, is a mere drop in the bucket. However, the necessity of giving a note signed by five or six men as endorsers, is a matter of good faith. We have an assured income to pay the bills of the association. If we have to be incorporated to publish a Journal, I say let's not publish a Journal.

DR. STANGE: I fail to see what the objection to incorporating is. Why should we not be incorporated? What is the great objection to doing business as an incorporated organization?

DR. MAYO: Gentlemen, we cannot do business unless we are incorporated. If you have advertising, you have got to have some one with some authority to collect it. You cannot collect a cent of money now for anything, for any purpose, unless you are incorporated, and I want to tell you if you start to publish an official Journal for this organization I seriously question whether you can publish such a Journal unless the officers of this association are personally responsible for any debts that may be incurred. It is just exactly what we had to do in publishing the proceedings last year. You may talk all you please about this matter of courtesy when they say, "Oh, they know this association always pays its debts." That is true. The association has an income but it is also true that the publishers want a note that is negotiable, that they can discount. The publishers have to have money with which to meet their expenses and they must have a negotiable note so when it comes down to that, a business proposition, you are going to find that there is no sentiment back of it all. It is all very well to talk about the sentimental phase of it but this business does not recognize sentiment and you have got to have a legal entity to do this. There is no question about it.

DR. RUTHERFORD: In order to throw a little light on this question, I might say that since Dr. Hoskins has pictured the career of an incorporated body, as being beset with many terrors, I would cite the experience of the Manitoba Veterinary Association which was incorporated over twenty years ago and has had a very smooth, uncheckered career, has never sued or been sued and I do not, for my part, see any such trouble as Dr. Hoskins has pictured. I think it is very desirable that this association should be incorporated so as to facilitate the business which is before us in connection with this Journal.

DR. FOX: As the mover of the adoption of this report, I wish to say, that while I agree with Dr. Hoskins as to the necessity of our having the moral support of our members, I believe that we should not do anything that would detract in any way from the morals of this association, nevertheless, I cannot understand why the incorporation of this association should detract in any way from its moral support or standing, none whatever. I have the privilege of belonging to two or three different organizations which are incorporated and have been incorporated for many years, in fact one of them is our state association, which was composed of only twelve members, or ten, as I remember it and the very first thing they did was to go to the state and take out their incorporation papers. It has now been in existence for twenty-seven years

and they never have had a particle of trouble in any way whatsoever. If we want to obligate ourselves in any way, it is not necessary for us to obligate our officers, or such members of the association as happen to be on the committee. It is not necessary for them to endorse notes and be responsible for our association, to the banks for the indebtedness incurred. Why not make this association an incorporation? Let it stand for its own liabilities. Incorporation would give the association standing and not detract in any way from the moral side or the moral support. I believe if this association is incorporated, it will have just as much moral support and probably more than at present. It could not in any way cause me to depreciate the pride I have in this association, simply because it has been incorporated.

DR. KEANE: We have no legal standing today. What is there to prevent some other veterinary association or other people of other organizations to organize another American Veterinary Medical Association and incorporate it and get legal standing and forbid this organization from retaining its name? I cannot see any objection to its incorporation.

DR. HOSKINS: Mr. Chairman, I don't think that Dr. Fox got my point. I probably did not make it as clear as I should. You incorporate under the laws of Illinois, for instance, or of Delaware, (the place where you will probably get it the cheapest) you will have to be responsible to all of the laws of that state, present and future. The point I wanted to bring out was that we do not attempt to exercise our powers today by any legal rights we might possess. We determine for ourselves what shall be the best thing for the majority of the association, by vote. The day we become a legally incorporated body, we then are responsible to the laws of the state, under which we are incorporated and you must respond in a legal way.

It is a sure thing for a man who may be offended by some statement made here in a paper presented on the floor, in which he may be held up to scorn and ridicule, for him to sue the association. It is the easiest thing in the world for him to institute proceedings against the association and you will find yourselves just as other organizations have found themselves, with suits piled up against you and they will be all over the land. It will be a very easy thing in the case of the Manitoba Veterinary Association where all of the members live within the province but it is a very different problem in the states with an incorporation having members in all of the forty-eight states, each state having its own laws, all different in many respects. The moment the body has a legal existence, that body can be sued and can sue. I hope I will never live to see the day that this association would have, by legal measures to enforce its mandates as decided by the majority of the association from year to year. It loses that great moral force, that we have stood for and it solves but one problem, that of getting credit and I think that is a minor problem. So with all due respect to Dr. Mayo, it is based upon the problem not more than once or twice to be met and quickly met and accepted when it was a momentary question.

DR. MAYO: Mr. President, Dr. Hoskins does not understand it. For instance, I gave a bond to this association from a bonding company for \$2,500.00. They said, "Whom are you making it out to? Is this society in

corporated?" "No." "Well," they said, "Make it out in the name of somebody." And I made it out to Dr. Marshall. Now, gentlemen, that was all the protection you had. In the case of the treasurer, it was the same thing. He gave a bond made out to some member of the association. He could take the money and go anywhere and you would have no redress. I hope we will be honest, we have been up to the present time but we cannot do business unless we are incorporated and you assume no more responsibility than any individual member does. Dr. Hoskins talks about some member making statements here for which he could be sued individually. What are you going to do about it? It is absolutely necessary that we incorporate. I call for a vote on it.

PRESIDENT MARSHALL: The question is called for. The question is, whether we will accept the recommendation of the executive committee and incorporate the association. Those in favor of incorporating the association as recommended by the committee, make it manifest by saying, "aye." Those opposed, "no." The "ayes" have it; it is so ordered.

DR. MAYO: I will state that I have received a telegram from the Ohio State Veterinary Medical Association, stating that they appropriated \$100.00 to the Salmon Memorial Fund and asking that certain resolutions be presented to the association. It has been referred to the chairman of the committee on resolutions. I have received a number of letters and telegrams from various members, who are unable to attend, all extending their regrets and wishes for a prosperous and successful meeting.

DR. ELLIS: I think this association has received communications from the Presidents of the State Societies and as they did some very active work with the Salmon Memorial, I think the matter should be presented here.

DR. MAYO: I think it will come up before the committee on resolutions.

I would also report the resolution of the executive committee, that a sub-committee consisting of the president of the committee, Dr. Moore, the president of the association, Dr. Marshall, and myself be appointed to consider the question of acquiring an already established veterinary journal.

DR. HOSKINS: I move that the recommendation be adopted. Seconded by Dr. Kinsley.

PRESIDENT MARSHALL: Gentlemen, you have heard the motion. Any remarks? Will you accept the recommendation of the executive committee, and that a sub-committee of three be appointed as stated by Dr. Mayo, to ascertain the advisability of taking over a Journal that is already established? The executive committee has made this recommendation. Any remarks?

DR. HALTON: I believe that the American Veterinary Medical Association has got enough work to do to take care of the medical and scientific end of the profession and ought not to dabble in a publication, practically a newspaper proposition and I believe the further they go into it the more trouble they will get into. I believe a newspaper or publication should be handled by private men. I am certainly very much opposed to the association dabbling into any Journal whatsoever.

DR. NELSON: Mr. President, I rise for information. I understand that

this other recommendation that we adopted, included all that. That this present executive committee was to establish a Journal. Now it seems to me that if we pass this other resolution, appointing a sub-committee it is going to complicate matters. Is this sub-committee going to report to this meeting or will they report to the big committee, or will they have to wait over for another year? It is simply a matter of information which I want to get.

PRESIDENT MARSHALL: The idea of the appointment of this sub-committee is that the association would be under no obligations at all but the committee would simply ascertain what could be done in the way of procuring some Journal already established and that committee would recommend whatever it thought best to the big committee. The idea of the sub-committee is that it should determine the cost of publishing such a Journal, terms, and so forth. We could then determine whether we would want to establish a new Journal or purchase one already established. This sub-committee, as I understand it, would make a recommendation to the committee on Journal.

DR. KINSLEY: I understood this whole matter was up to the executive committee as provided in the resolution. It seems to me that covers the matter.

DR. FOX: As I understand it, the three members of this sub-committee, are members also of the big committee, and it would seem to me that it does not matter which way we act, that they are all members of the executive committee and if the executive committee feels like selecting them to take charge of this particular part of the work, it is up to them, or if the association feels like putting them in to do this part of the work, it really makes no difference whatever. I want to know whether it is the intention of this sub-committee to report to this meeting or go on for the year and make their report in regard to this Journal at the next meeting, which in my opinion, would be the best to do inasmuch as it would seem rather a large undertaking to look over printing establishments, presses, and so forth and report back here in a few minutes. It seems to me this is rather too big a job for that.

PRESIDENT MARSHALL: At the time this suggestion was made, the resolution we have already adopted had not been approved. I doubt if that sub-committee would have been recommended if we had known you were going to adopt the resolution you have adopted. In my opinion, that committee has authority to do what the sub-committee has asked for and if you have no objections I will just let that suggestion die. I will withdraw it. As no objections have been offered, it is withdrawn. Are there any other recommendations for the executive committee? If not, the next order of business, is the report of the special committee on veterinary college investigation. You will remember perhaps, that at the second session, the report of the committee on intelligence and education was presented but the discussion was postponed until the report for this other committee should be accepted, so we will now call for the report of the special committee on veterinary college investigation and discuss the two reports together.

The special committee on college investigation is composed of the following: Chairman, Dr. M. H. Reynolds, George W. Dunphy, and P. H. Brown. Dr. Dunphy, I believe, is the only member of that committee present. Is Dr. Dunphy in the room?

DR. DUNPHY: Mr. President, in the absence of Dr. Reynolds, I might say that this report was turned over to myself and Dr. Browning. We have gone over the report carefully and there are some matters in the report, we have decided to leave to the association and executive committee.

I would ask the secretary as a favor to me to read this report. I am so hoarse this morning I do not believe I could make you understand after I have read for a few minutes. If there are any remarks or questions afterwards, I will be pleased to answer them to the best of my ability, but with my throat in the condition in which it is, I must conserve my voice.

Secretary Mayo then read the report of the special committee on college investigation for the years 1913 and 1915, as follows:

REPORT OF COLLEGE COMMITTEE FOR YEARS 1913-15*

We would first of all express our appreciation of the uniform courtesy shown us by the institutions visited in the course of our work. Not only have responsible officers of several institutions met us in good spirit, given us all desired information and placed their records freely before us, but individual members of faculties with very rare exceptions have been equally courteous and helpful.

GENERAL METHODS

PLAN OF WORK:—When visiting an institution for this purpose we have endeavored to put ourselves first into the position and attitude of the new student or the general public visiting such an institution for the first time and then we have endeavored also to get a general impression of the institution from a professional standpoint, estimating the institution in a very general way as to the fitness for its purpose.

We have had the advantage this year for the first time of a standard curriculum. Last year our by-laws were greatly improved by the addition of certain regulations taken from B. A. I. circular 150. This has been a great aid to your committee in its work of inspecting and measuring institutions. This association should still understand however that it is easily possible for a comparatively inferior institution to comply with the letter of the law so far as our by-laws are concerned.

FINDINGS

GENERAL SURROUNDINGS:—Reporting now for the general surroundings of veterinary schools, social, moral, etc., we must report

* We regret very much that, due to oversight, Dr. D. M. Campbell of Chicago was not given proper credit in this report for a very considerable amount of active assistance inspecting with the chairman the following institutions: Cincinnati Veterinary College, Grand Rapids Veterinary College, Indiana Veterinary College, Terre Haute Veterinary College.

a very great diversity still existing in American veterinary colleges. Some of our colleges measure up exceedingly well in these respects, just as well as any other schools of technical education. Some of our accepted schools are just fair in these general aspects, some are in very undesirable neighborhoods or have other conditions connected directly with the school which makes the ethical conditions undesirable.

In some of our veterinary colleges the class rooms, laboratories and general surroundings are all that could be reasonably desired in appearance. Others are extremely dreary, uninspiring or even seriously objectionable.

We feel quite justified in calling the attention of our profession to this again, on the ground that it is a matter of great importance to the profession.

The general situation with our veterinary colleges has in recent years improved materially in these respects. Quite a number of our veterinary faculties which heretofore were apparently indifferent or at least had done nothing, possibly because the matter had not been brought to their attention and who apparently felt no responsibility concerning students' moral and social welfare are now conceding they have been wrong and either have important changes under way or have made definite plans for improvement.

AMOUNT OF WORK AND DISTRIBUTION OF SUBJECTS:—We find that the amount of instruction per individual teacher and distribution of subjects is now very satisfactory with only a few exceptions. Formerly we had a number of schools where a few men on each faculty were doing practically all of the work with a lot of other names carried on the faculty list chiefly for advertising purposes. This condition has largely disappeared.

We have this year criticised excessive assignments to only a few men out of the large number of faculty men concerned in the institutions visited.

Careful examination shows that a number of recognized schools are not complying with regulations XI, XII and XIII of article VIII, section 2, relating to the number and qualification of veterinarians for specified major subjects. According to the best information your committee could get from inspection, catalogs and correspondence it appears that a majority of the schools have been operating during the college year 1914-15 in violation of one or

more of these three regulations concerning faculty members and major subjects—usually XI and XIII.¹

FACULTY FITNESS FOR SUBJECTS:—Concerning fitness of faculty men for their subjects and work in general, we would report that there are a few men on veterinary college faculties inspected this year who have no special qualification for their subjects, usually laboratory subjects, where thorough special training is desirable. These have usually been earnest and otherwise capable teachers who could unquestionably give satisfactory service if transferred to some other subject. In some cases we have recommended, in the private report prepared for transmittal to each individual institution, that these men should avail themselves of special courses in leading universities where they can study with masters of their subjects and have every needed facility for doing advanced work.

It is inevitable that in any line of professional teaching with so many faculty men involved there must be a few men who could not be considered otherwise than unsatisfactory for one reason or another. Faculty conditions in this respect are not yet ideal but there is a steady improvement.

MATRICULATION REQUIREMENTS:—On account of changes in our matriculation requirements beginning with the school year 1914-15 we have given unusual attention this year to this phase of our committee work. Considering for each institution general condition of examinations, questions, markings, records of acceptances in lieu of examination, and number of new students with one or more years of high school.

Concerning matriculation requirements we find that there has been a constant improvement in meeting the spirit of A. V. M. A. requirements so far as common school branches are concerned. For several institutions, we have criticised the use of "letter writing" and "copying from plain copy" to bring up low averages in other subjects. In several cases we criticised the sample questions sent out to prospective matriculants because they are too similar to questions actually asked the same students later on in matriculation examination. In a very few cases only did your committee think the questions on common school subjects were too easy to comply with the spirit of the association requirements for these subjects. In state institutions the matriculation work is usually

(1) Exact information not given. Reported to the committee as violating this section.

entirely outside of the veterinary faculty and in charge of a general faculty committee or some officer of the institution. Most of the other schools appear to have used a common and agreed upon set of questions. The same sets of questions were found at different schools in widely separated portions of the country. Apparently several sets have been prepared and each institution selects from these.

In a few cases schools have prepared their own questions or have had them prepared by high school men and these have usually been more satisfactory than the common sets.

Matriculation records are being very much better kept and are much more readily available than formerly.

Concerning this matter of sample questions, we submit here the following list of sample questions to prospective matriculants, and questions actually used on examination. In our opinion, the custom of sending out sample questions should be either discontinued or they must be quite different from those actually used. Sample questions should only indicate the difficulty of the examination and give no intimation of the specific topic or problem:

Sample Question: "For what are each of the following men noted: Thomas A. Edison; Abraham Lincoln; General Custer; Admiral Dewey?"

Question used for matriculation: (1) "Who was President of the United States during the Civil War?" (2) "During what war and at what place did Admiral Dewey gain fame?"

Sample Question: "Name the principal rivers emptying directly into the Mississippi River."

Question used for matriculation: "Name the longest river in the United States. Into what body of water does it empty?"

Sample Question: "From 39,616,787 subtract 7,935,662 and divide the remainder by 149."

Question used for matriculation: "Subtract 86,347 from 94,231 and divide the remainder by 16."

Sample Questions "Express the following in decimal fractions: $\frac{3}{8}$, $\frac{1}{4}$, $\frac{8}{10}$, $\frac{2}{5}$, $\frac{1}{2}$."

Question used for matriculation: The same excepting slightly different common fractions were used.

Concerning our one year high school or equivalent requirements, we have assumed that the various colleges have taken for granted that their matriculation examination was equivalent to the

one year of high-school work, but your committee was of the opinion that in many instances their examination questions did not come up to this requirement.

As this condition seems to be so general, the committee have deemed it advisable to over-look this technicality and have called the attention of such schools to this matter in our private letter of criticism, believing that a minor matter of this kind can be regulated in that way without the chance of disqualifying graduates of such schools for membership in this association, which would be almost unfair considering the short time that the regulation has been in force and that there was no meeting of the association in 1914.

Most of the schools which your committee report as failing in this requirement appear to have adopted as one year high school equivalent, a uniform list of 32 sets of questions on affairs of every day life, such as dairying, poultry raising, retail meat trade, horse training, horse salesmanship, general merchandising, horseshoeing, barbering, etc.

The following are selected as fair samples of these questions and are here submitted for publication as a portion of this report, taking uniformly the first question from each set at random:

Farm Crop Raising: What disposition should be made of farmyard manure? Give method of disposition.

Meat Industry: How are swine killed and dressed for food?

Horse Training: What are the essential qualifications for a successful horse trainer?

Horse Salesman: What qualifications should a good horse salesman possess?

General Merchandising: What commodities of a general grocery stock should be kept in a refrigerator?

Horse Feeding and Breeding: Describe your ideal type of horse for general farm work. (color, weight, breed, etc.)

Barber: Describe generally what you think should be the qualifications of a barber so as to insure success in business.

Stock Raising: What is the most important consideration in selecting a range?

Milk Distribution: Is it necessary to keep milk cool until consumed? Why?

Cheese Making: What is cheese?

Farm Mechanics: How high would you make a wire fence for confining hogs?

Southern Farming: What type of mule is best adapted to cotton farming?

In the opinion of our committee this cannot be considered as a reasonable compliance with the matriculation requirements calling for one year of high school or an equivalent.

The following is a sample high school course obtained in one of the cities where there is operating one of the schools here listed as failing to comply with this requirement. The three courses which appear best adapted for a veterinarian's foundational education "Classical", "Modern" and "Scientific" call for first year the following:

Classical course calls for English, Latin, algebra and either ancient history or botany or physiography.

The modern course calls for English, algebra, ancient history and either German 1, or botany or physiography.

The scientific course calls for English, Latin, algebra and either physiology with civil government or botany or physiography.

Records of acceptance in lieu of matriculation examinations, i. e. acceptance of credits from other institutions, principally high schools have in general been very satisfactory. We have found an occasional case that looked questionable at first, but more careful examination has shown reasonable compliance.

Concerning improvement in general appearance, personal and general quality of student bodies, especially matriculants there can be no question as to a steady and very satisfactory improvement. There has been a marked improvement even within the past few years.

Institutions in different parts of the country vary greatly in respect to the number of students who have had one year or more of high school. In some of our private colleges the proportion of students who have had such advantages has been surprising, especially when we consider that actual high school attendance had not been a requirement. In other institutions perhaps not widely distant, the proportion of students who have had high school work is very small, but in general there is a steady and rather rapid increase.

GRADUATION REQUIREMENTS: We have no criticisms to offer concerning graduation requirements or customs so long as present

methods must continue under which each faculty conducts its own final examination. We feel that this is reasonably well done and with exceedingly rare exceptions in good faith. Undesirable students are now usually dropped before reaching their senior year.

RESULTS OF PREVIOUS CRITICISMS:—A careful comparison of college committee criticisms and suggestions as they appear in our supplementary report for 1912-13 with the criticisms and suggestions for the same institutions as they appear in our present supplementary report indicates that: criticisms concerning building conditions have been generally complied with; that criticised laboratories have been greatly improved; that lack of library facilities has been met in only a few cases; that criticisms concerning responsibility for student social and moral welfare was acknowledged this year for the first time in several institutions which we hope will have actual plans under way for the next college year. Quite a number of schools are still completely ignoring this responsibility.

Criticisms concerning matriculation methods have been very generally met especially as to keeping of good records in available condition.

Criticisms concerning faculty, e. g. use of men without special training for subjects which plainly require such training have not been well complied with in the few cases where such criticisms have been made. There should be either rearrangement of the faculty under such conditions or such men should avail themselves of opportunity for summer course work at some of our leading universities.

GENERAL STATEMENT:—Making now a general summary and being quite frank rather than complimentary, we would report that some of our veterinary schools compare in all respects very favorably with other professional schools. On the other hand, there are a serious number of our recognized schools not only below, but very far below technical schools for other lines of professional work. As a profession, we will make much more rapid progress if we are willing to open our eyes and face some of these disagreeable truths frankly. It would be much easier for your committee to express complimentary generalities in this connection, but we feel that these would do no harm by blinding us to serious faults and important needs. When we draw this general conclusion, we are considering buildings, equipment, libraries,

museum, laboratories, spirit of investigation and research, college atmosphere, faculty men as to technical training, general efficiency of class room and laboratory work, matriculation requirements, length of course, etc.

Considering all these things honestly, it appears only too apparent that our general level is not yet up to the general level of similar colleges for other lines of professional and technical work—not a pleasing thing to say; but a wholesome thing to know if true.

Please bear in mind we are speaking now of a general level and not of institutions that must be regarded as exceptional.

ARKANSAS VETERINARY COLLEGE:—This being a new institution which has recently applied for recognition, it is deemed advisable to submit a special report concerning it.

This school was visited on March 15, 1915. Briefly summarized we find: first, that this school has been operating in violation of sections 2 and 3, article VIII relating to matriculation requirements and faculty eligibility for major subjects. This school has been in operation only two years. Two classes are in attendance. In addition to violation of sections 2 and 3, article VIII this school is considered as seriously lacking in building, equipment, laboratory facilities and faculty.

Two members of the faculty are teaching five of the specified major subjects, the sixth is taught by an M.D. There are of course several other members of the faculty other than those on the major subjects specifically mentioned in our by-laws for which there are special requirements.

On account of failure to conform to by-law requirements and inadequacies already mentioned, your committee feels obliged to recommend against recognition for the two years 1913-15, the time in which this school has been in operation. This of course leaves the way open for future recognition when satisfactory improvements have been made.

ONTARIO VETERINARY COLLEGE. *Special Report*:—On account of the refusal by its management to submit to inspection, this institution was not listed by the association in 1913 and, of course, no report was made and no association action was taken in 1914 on account of failure to hold association meeting.

Early in 1914 this association was approached indirectly through letter from the Ontario Minister of Agriculture, indicat-

ing a willingness for inspection on the part of this association. The matter was referred to the chairman of this committee and by him to President Marshall for instruction with the result that two representatives of our committee visited this institution in April, 1914.

As members of our profession must be generally aware, the Ontario Veterinary College is now a part of the university of Toronto under government control.

We find this institution now equipped with a new and magnificent building, class-room, laboratory and other facilities for a splendidly improved work. The committee in its private report for this institution makes a number of suggestions which there is no good reason to include here.

This institution has been hampered during the year by the war, in which Canada has been seriously concerned. This has interfered especially with clinic and certain lines of class-room work and some of the major subjects. Under the circumstances everyone concerned will, undoubtedly, be more than willing to make all allowances.

There appears to be a marked tendency on the part of this school to constitute her faculty very largely from her own alumni. Eight out of the nine veterinarians being Ontario Veterinary College graduates, but the Ontario Veterinary College is not by any means alone in this tendency. Several of our most prominent schools on this side of the line show the same condition in their faculty lists.

This school, like a number of American schools, has been operated (technically speaking) in violation of section 2, article VII, by-laws 1913.

There is a question involved here that the committee believes would be wiser to refer to the association or executive committee, or both, in regard to the faculty of this college. The Dean of the institution contends that the Ontario Veterinary College, as now constituted, is a distinct school from the old Ontario Veterinary College (Ltd.), having been taken over by the Ontario government, rebuilt and reorganized as a part of the university of Toronto.

The committee were undecided in regard to this interpretation of the case and consequently feel that, in justice to all concerned, this should be referred to the association or the executive committee to decide.

Except for this, your committee would recommend this institution for restoration to recognition. The Ontario Veterinary College is now, undoubtedly, entitled to the same footing as other schools previously listed in this report, as the majority of them are now found in technical violation of article VIII which relates to faculty requirements for major subjects and one year high school for matriculation.

SAN FRANCISCO VETERINARY COLLEGE. *Special Report*:—On account of the fact that our main inspection in the San Francisco Veterinary College was not made during the same college year as for the other colleges here reported and on account of the fact that in the past informal charges have been made against the San Francisco school and its management, and an expressed desire on the part of responsible officers of our association, members of the executive committee and older members of the association for official information, it has been deemed advisable to include here a special report on this institution.

This institution was visited by two members of the committee and the following report is based on this inspection:

Additional details of criticisms and some minor criticisms not mentioned here are included in our supplementary report for the management of the institution.

The general surroundings of this school, its class rooms, laboratory facilities and equipment, social atmosphere, etc., are fully as good as a number of others already recognized.

The school is located in a fairly good neighborhood.

The amount of instruction given and distribution per individual teachers was satisfactory with the exception that Dr. O'Rourke, in charge of three important subjects, surgery, obstetrics and therapeutics in addition to a private practice to maintain, appeared to be overloaded.

An important position on the faculty (physiology) had not been filled at the time of inspection when work should have been under way and there had been no provision made for carrying this work.

Matriculation was conducted in about the usual way for similar schools. Markings were satisfactory as were also records of acceptances, from other institutions with the exception of certain minor criticisms already made to the management.

Concerning compliance with our by-law requirements, regula-

tions XI to XIII, section 2, article VIII relating to the teaching of specified major subjects we find that this school in common with quite a number of other institutions is failing to comply with these requirements. Note that this last statement is for the college year 1914-15, this being the first year for which these requirements have been in force. The violation here is of regulations XI and XIII, there being at most but four veterinarians in service eligible for the specified major subjects, if our information is correct.

Concerning section 3, article VIII, by-laws 1913 relating to one year high school or equivalent as a matriculation condition, we would report that this institution in common with others has operated during the college year 1914-15 in violation of this regulation also.

This school is considered by the committee as subject to reasonable criticism on account of too much shifting in the faculty. The building in general, class rooms, laboratories, etc. were not in a condition creditable to a professional college, certainly not inspiring toward high professional ideals, being untidy and in disorder.

The surgical clinic room was in bad condition and it was difficult for your committee to see how clean, creditable surgery could be taught in such an untidy room. But we would warn against a too hasty condemnation on this point as several other recognized institutions have been found during the past two years in fully as bad condition.

Concerning questions that have been raised as to facts of incorporation ownership of institution, personal questions relating to faculty members, etc., it appears to your committee that many of these questions are not the concern of either this committee or the association except as they bear upon proper organization and management in relation to the student's welfare or the welfare of the profession as a whole.

Investigation showed satisfactorily that this institution has been properly chartered as an educational institution, not as a business institution.

One of us (Reynolds) saw a certified copy of Articles of Incorporation signed by the secretary of the state, dated February 12, 1912, this being the second set of Articles of Incorporation. A certified copy of the first charter was also submitted to the chairman of this committee. A deputy recorder stated in our presence at the court house that they had no records of this kind dating prior to the earthquake.

REORGANIZATION OF COMMITTEE WORK:—We would again call attention to the overlapping function of the committee on college investigation and the committee on intelligence and education and would again recommend the adoption of some plan similar to that of the American Medical Association, a fairly stable council involving the fusion of these two committees. We propose the following by-law amendment:

Substitute for the fifth line of article VII the following: “(Committee on veterinary education, three members,” term of office (3) three years, one membership expiring each year.

Substitute for section 2 the following:—“It shall be the duty of the committee on veterinary education to investigate the work of the American veterinary colleges and to report to the association such general findings, suggestions, and criticisms concerning the same as it may deem advisable.”

“It shall also be the duty of this committee to annually recommend to the association a list of veterinary colleges for recognition by the association with reference to eligibility to membership of their graduates.

“It shall also be the duty of this committee to keep in touch with the general progress of education in the veterinary, and allied professions and make such report from time to time as it may deem advisable.”

LIBRARY AND MUSEUM:—We recommend that this association shall by official action take a position to the effect that adequate museum and library facilities shall be considered as a requirement of an acceptable veterinary college. Several schools have made creditable starts in this direction during the period here reported, but there is still a very general lack in this respect. We propose the following resolution:

“Resolved that it be expressed as the sense of this association that adequate museum and library and suitable reading room facilities should be considered as among the essentials of a modern well equipped veterinary college, and that at an early date our by-laws shall be changed accordingly.”

PLAN OF COMMITTEE REPORT:—It is further recommended by your committee that the general plan of submitting this committee report in two sections, one for reading and publication, the other a supplementary report consisting of criticisms and suggestions prepared by the committee for transmittal by our association secretary to the college concerned, be approved and continued.

(To be continued)

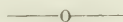
FROM THE OFFICE OF THE SECRETARY OF THE A. V. M. A.

RESIDENT STATE SECRETARIES FOR 1915-1916

Alabama.....	W. W. Webb, Auburn.
Arizona.....	J. C. Norton, Fleming Block, Phoenix.
Arkansas.....	R. M. Gow, State Veterinarian, Old State House, Little Rock.
California.....	J. F. McKenna, 616 Eye St., Fresno.
Colorado.....	I. E. Newsom, Division of Veterinary Science, Colo. State College, Ft. Collins.
Connecticut.....	A. T. Gilyard, Waterbury
Delaware.....	H. P. Eves, 301 West 18th St., Wilmington*
Dist. of Colum.....	H. S. Gamble, 1329 Gallatin St., Washington
Florida.....	Fred W. Porter, 1113 Florida Ave., Tampa
Georgia.....	W. M. Burson, State College of Agriculture, Athens
Hawaii.....	V. A. Norgaard, Territorial Veterinarian, Honolulu
Idaho.....	J. R. Fuller, Weiser
Illinois.....	L. A. Merillat, 1827 South Wabash Ave., Chicago
Indiana.....	T. A. Sigler, Greencastle
Iowa.....	H. C. Simpson, Denison
Kansas.....	J. H. Burt, Manhattan
Kentucky.....	Robert Graham, Agr. Expt. Station, Lexington
Louisiana.....	W. H. Dalrymple, Baton Rouge*
Maine.....	Henry B. Westcott, 1008 Congress St., Portland
Maryland.....	John H. Engel, 1141 Hartford Ave., Baltimore*
Massachusetts...	Edward A. Cahill, Dept. of Animal Industry, State House, Boston
Michigan.....	W. Austin Ewalt, Mt. Clemens
Minnesota...	H. Preston Hoskins, University Farm, Division of Vet. Science, St. Paul
Mississippi.....	O. M. Norton, Greenville
Missouri.....	C. D. Folse, 1336 East 15th St., Kansas City
Montana.....	F. S. Gray, Great Falls
Nebraska.....	C. J. Norden, Nebraska City
Nevada...	W. B. Mack, Dept. of Vet. Science, Univ. of Nevada, Reno
New Hampshire.....	A. C. Farmer, Berlin*
New Jersey.....	E. T. Davison, Athenia
New Mexico.....	G. A. Lipp, Roswell

New York	C. P. Fitch, New York State Veterinary College, Ithaca
North Carolina	B. F. Kaupp, Raleigh*
North Dakota	C. H. Babcock, New Rockford*
Ohio	S. Sisson, Div. of Veterinary Medicine, Ohio State University, Columbus
Oklahoma	Joseph E. Nance, Anadarko*
Oregon	W. Dean Wright, 1227 Missouri Ave., Portland
Pennsylvania	E. H. Yonker, 2344 North 18th St., Philadelphia
Philippines	William Boynton, Bureau of Agriculture, Manila
Porto Rico	Carlos Ortiz, 26 Villa St., Ponce*
Rhode Island	J. S. Pollard, 183 Harrison St., Providence
South Carolina	B. K. McInnes, Charleston
South Dakota	S. W. Allen, Watertown
Tennessee	No one appointed as yet, M. Jacob, State Veterinarian, Nashville, acting
Texas	A. A. Foster, Marshall
Utah	John Ernst, Jr., 125 E. 4 South St., Salt Lake City*
Vermont	F. H. Rich, Vermont Agricultural Experiment Station, Burlington
Virginia	William G. Chrisman, Blacksburg*
Washington	Carl Cozier, Bellingham
West Virginia	E. Layne, Huntington
Wisconsin	W. A. Wolcott, Madison
Wyoming	Hugh R. Millard, 2507 Central Ave., Cheyenne

**These men have not yet filed acceptance of appointment.*



RESIDENT PROVINCIAL SECRETARIES

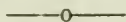
CANADA

Alberta	F. A. McCord, 215 Queen's Ave., Edmonton
British Columbia	J. G. Jervis, 3694 Victoria Drive, Vancouver
Manitoba	William Hilton, 334 Elgin Ave., Winnipeg*
New Brunswick	D. McCuaig, McAdam Junction
Nova Scotia	George Townsend, New Glasgow
Ontario	George Hilton, Department of Agriculture, Ottawa
Prince Edward Isle	W. H. Pethick, Charlottetown
Quebec	M. C. Baker, 194 Milton St., Montreal*
Saskatchewan	H. L. Dixon, Maple Creek*

**These men have not yet filed acceptance of appointment.*

LIST OF COLLEGES RECOGNIZED BY THE A. V. M. A.

Alabama Polytechnic Institute, College of Veterinary Medicine.
Chicago Veterinary College.
Cincinnati Veterinary College.
Colorado State College, Division of Veterinary Medicine.
George Washington University, College of Veterinary Medicine.
Grand Rapids Veterinary College.
Indiana Veterinary College.
Iowa State College, Division of Veterinary Medicine.
Kansas City Veterinary College.
Kansas State Agricultural College, Veterinary Department.
McKillop Veterinary College.
Michigan Agricultural College, Division of Veterinary Medicine.
New York American Veterinary College.
New York State Veterinary College.
Ohio State University, College of Veterinary Medicine.
Ontario Veterinary College, Toronto.
St. Joseph Veterinary College.
San Francisco Veterinary College.
State College of Washington, Veterinary Department.
Terre Haute Veterinary College.
United States College of Veterinary Surgeons.
University of Pennsylvania, School of Veterinary Medicine.



On account of numerous inquiries coming into the secretary's office, the following information concerning the A.V.M.A. dues and the privileges of members with respect to the *Journal* has been prepared:

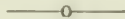
Dues are payable in advance beginning on the first day of the annual convention. On receipt of the dues, the secretary issues the membership card for the current year. Although in 1914 no convention was held dues for that year were collected in the fall of 1914. Members who paid their dues in advance at the Oakland convention received 1915 membership cards. Members who have delayed paying their dues and pay them now will of course receive only the 1915 membership card. The 1916 dues are not payable until August 22, 1916 and bills for such dues will not be sent out until about that time. However, any member who may desire his 1916 card now may receive it at once by paying his dues in advance.

At the Oakland meeting the association voted to increase the annual dues to five dollars. This is a change in section 2 of article

X of the by-laws and goes into effect August 22, 1916. Accordingly, applications for reinstatement must now be accompanied by eleven dollars, to cover the six dollars obligated at the time of suspension and one year's dues in advance. Since applicants for membership must pay one year's dues in advance, this action of the association in increasing the dues has also necessitated a modification of section 1 of article VIII, increasing the sum which must accompany applications to ten dollars. Applicants for membership who have paid their subscription to the *Journal* in advance since October, 1915 may have this credited as a part of their membership fee by writing to the Editor, Dr. P. A. Fish, Ithaca, N. Y. and asking him to notify the secretary. Such applicants need remit only seven dollars.

The *Journal* of the American Veterinary Medical Association, formerly the American Veterinary *Review*, comes free to every member who pays his dues in advance. The United States Post Office Department requires the secretary or editor to secure written consent from each member to whom the *Journal* is sent that two dollars of his dues be used to help defray the expenses of the *Journal*. Accordingly, coupons for this purpose have been attached to the printed application blanks and statements of dues sent out from the secretary's office.

According to the constitution and by-laws, members remain in good standing until they are eighteen months in arrears. However, in order to comply with the Post Office regulations, only those members who keep their dues paid up to within the current year may receive the *Journal* without other payment than their dues. The price of the *Journal* to all others, whether members or not, is three dollars a year. Any one can secure the *Journal* at this price.



SOCIETY MEETINGS

WISCONSIN VETERINARY MEDICAL ASSOCIATION

The Wisconsin Veterinary Medical Association held its annual meeting at the State Capitol, Madison, Wis., January 18, 19 and 20, 1916.

The unusually large attendance, and the great interest manifested, was conclusive evidence of the fact that the Wisconsin Veterinary Medical Association is a real live organization.

We had the pleasure of having Dr. J. V. Lacroix of Kansas City with us who gave a very interesting talk on "The Surgery of Fistulous Withers," which was followed by a demonstration of same at the clinic the next day.

We were also very fortunate in securing Dr. H. Preston Hoskins of Minn. as one of the speakers. He spoke on "Some Phases of the Use of Serum in Controlling Hog Cholera." We were fully convinced that there was still much to learn pertaining to this broad subject.

The dinner session, attended by 150 guests, was held in the brown room of the Park Hotel, January 19, and proved a joyous occasion. Dr. L. A. Wright acting as toastmaster. Brief speeches followed the banquet, directed by the toastmaster, in which the following took part: C. P. Norgard, Head of the State Board of Agriculture; S. A. Baird, President of the State Breeders' Association; A. Hopkins, Secretary of the State Breeders' Association; Dr. Joseph Hughes, Chicago; Dr. J. V. Lacroix, Kansas City; Dr. H. P. Hoskins of the University of Minnesota; and Dr. O. H. Eliason, State Veterinarian of Wisconsin. All made special pleas for co-operation between the veterinary profession and the live stock breeders.

Dr. A. S. Alexander, Professor of Animal Husbandry of the University of Wisconsin, proved his ability as an instructor and entertainer when he gave his favorite talk on "Rural Life in Scotland", illustrated by stereopticon views, this being the real "after dinner mint" of the occasion.

After two days of strenuous work in the convention hall, the third and last day was devoted to clinical work at Dr. J. P. West's Infirmary, in charge of Drs. Lacroix, Heer, Ferguson and their worthy assistants.

The following literary program, in conjunction with several very interesting committee reports, was carried out very successfully:

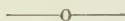
Use and Limitation of the Tuberculin Test.....	Dr. C. M. Crane
Tuberculosis Eradication.....	Dr. J. P. West
State Inspection.....	Dr. O. H. Eliason
Establishment of Inspected Herds.....	Dr. J. F. Roub
Avian Tuberculosis.....	Dr. B. A. Beach
The Dog as a Carrier of Parasites and Disease....	Dr. H. E. Horel
The Effect of Pituitary Gland Extract on Milk Secretion in the Cow.....	Dr. F. B. Hadley
Some Phases of the use of Serum in Controlling Hog Cholera	Dr. H. P. Hoskins
Necrobacillosis	Dr. G. A. Gettelman

Mastitis	Dr. D. E. Murphy
Hydrocele in a Yearling Bull.....	Dr. R. S. Heer
Stricture of the Esophagus.....	Dr. L. A. Wright
Fistulous Withers.....	Dr. J. V. Lacroix
Some Specific Substances which Influence Reproduction....	
.....	Prof. E. B. Hart
Hemorrhagic Septicemia.....	Dr. L. J. O'Reilley
Acute Hemorrhagic Enteritis.....	Dr. W. R. Swan
Forage Poisoning in Cattle.....	Dr. J. F. Roub
Vaginal Polypus.....	Dr. V. S. Larson
Pneumonia in Cattle.....	Dr. R. E. Schuster

The following officers were elected and installed for the ensuing year: Dr. L. J. O'Reilley, Merrill, President; Dr. Herbert Lothe, Sharon, Vice-President; Dr. W. A. Wolcott, Madison, Secretary; Dr. J. F. Roub, Monroe, Treasurer.

The meeting was voted an entire success and adjourned, to meet at Menomonie, Wis., next July, on invitation of Dr. J. D. Lee.

W. A. WOLCOTT, Secretary.



KANSAS VETERINARY MEDICAL ASSOCIATION

The twelfth annual meeting of the K. V. M. A. was held in the City Building, Kansas City, Kansas, January 5-6, 1916. It was one of the best meetings ever held by the association and interest did not lag from start to finish. In addition to interesting papers and talks by the members, the association was very fortunate in having Dr. A. Eichhorn of the B. A. I., Washington, and Dr. H. Palmer of H. K. Mulford Co. to take part in the program.

Dr. Eichhorn's paper "The Treatment of Diseases with Biological Products" was an excellent paper and created much interest and discussion. The author informed the secretary of the association that the paper will appear in the veterinary publications in the near future, and the association can assure the veterinary profession that a treat is in store for it.

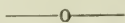
Dr. Palmer gave an illustrated talk on the "Manufacture of Biological Products."

Dr. L. W. Goss, Pathologist K. S. A. C. and member of the association, gave an interesting illustrated talk on the "Outbreak of Foot-and-Mouth Disease in Kansas."

Dr. J. W. Guilfoil was elected president for the coming year; the present secretary was re-elected,

Fifteen new members joined the association. The next meeting will be held at Wichita, January 2-3, 1917.

J. H. BURT, Sec'y-Treas.



VIRGINIA STATE VETERINARY MEDICAL ASSOCIATION

The meeting of the Virginia State Veterinary Medical Association convened at Richmond, January 13 and 14. We had the best meeting the association has ever experienced. There were sixty per cent (60%) of the membership present. Our program was one of the best ever rendered. The papers and addresses were of the highest type.

Dr. Horace Hoskins of Philadelphia gave a very interesting talk in which he eulogized the life of Dr. D. E. Salmon, and outlined to our association the memorial fund which was responded to by every member of the association present.

Dr. C. H. Hayes, a specialist on hog cholera, in charge of the extension assigned to the state by the B. A. I., gave a splendid talk on the preparation and administration of hog cholera serum, accompanied by stereopticon views.

Dr. Henry Marshall of the B. A. I. packing house work at Richmond gave a splendid paper on White Scours.

Dr. S. C. Neff of Staunton, Va., gave a very interesting and instructive paper on septicemia, as the result of a kick.

The banquet, which was served by Mr. James Disney, manager of the Murphy Hotel, was a regular seven course Virginia dinner. There were eighty covers. The guests of honor were Gov. Stuart, ex-Gov. Mann, J. L. Houston, speaker of the house, and a number of senators and representatives. Dr. Henry Marshall of Richmond, Dr. C. H. Hayes of Burkeville, Va., and Dr. W. Horace Hoskins.

Dr. Ferneyhough, chairman of the committee, presided as toastmaster. Those responding to toasts were Gov. Stuart, ex-Gov. Mann, Hon. Westmoreland Davis, Hon. J. L. Houston, speaker of the house, Col. Leedy of the senate, Representatives Grasty and Willis, and Dr. W. Horace Hoskins.

The officers for the ensuing year are: Dr. H. H. Adair of Bristol, President; 1st Vice-President, Dr. D. V. Glover of Lexington; 2nd Vice-President, Dr. D. E. Buckingham of Washington, D. S.; Sec'y-Treas., Dr. W. B. Chrisman of Blacksburg.

The time and place of the next meeting is Ocean View, July 13 and 14, 1916.

W. G. CHRISMAN, Sec'y-Treas.

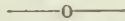
FLORIDA VETERINARY MEDICAL ASSOCIATION

The second annual meeting of the Florida Veterinary Medical Association was held February 7 in the State Board of Health Laboratory with a representative attendance of officers and members. The only officer absent was Dr. F. H. Armstrong of Pensacola, vice-president. Several prominent Department of Agriculture attaches were present and addressed the convention.

Officers were elected for the ensuing year, the former board of officers being re-elected. They are: President, Dr. C. F. Dawson, Jacksonville; Vice-President, Dr. F. H. Armstrong, Pensacola; Secretary-Treasurer, Dr. Fred W. Porter, Tampa. The following were elected to honorary membership in the association: Dr. Nighbert and Dr. Logan of the United States Department of Agriculture and Prof. C. H. Willoughby of the University of Florida.

The following members attended the convention: Dr. Dawson, Dr. W. A. Munsell, Greene Cove Springs; Dr. W. J. Tanner, St. Petersburg; Dr. Fred W. Porter, Tampa; Dr. W. O. Kemp, Key West; Dr. W. P. Link, Tampa, and Dr. A. Dolan, Sanford.

F. W. PORTER, Secretary.



OKLAHOMA GRADUATE VETERINARY MEDICAL ASSOCIATION

The semi-annual meeting of the Oklahoma Graduate Veterinary Medical Association was held at Oklahoma City, January 18 and 19, 1916. This was a very successful meeting as harmony prevailed. There was a large attendance and some instructive papers and addresses were given; also some interesting discussions upon various subjects were held.

Among those giving addresses and papers were: Dr. V. W. Knowles of the B. A. I. in an instructive address on vaccination and sanitation in eradication of hog cholera;

Dr. J. G. Eagle gave an address on the serum treatment of hog cholera;

Dr. E. V. Robnett, State Veterinarian, presented a paper on hemorrhagic septicemia of cattle;

Dr. D. W. Gerber read a paper on influenza of horses in its various forms;

Dr. C. R. Walters gave a paper on the accuracy of the intradermal tuberculin test;

Dr. C. E. Steele told of experiences on his recent trip to Europe with a ship load of mules for the English Government;

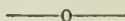
Dr. J. E. Nance described in an interesting manner his experiences in the Philippine Islands as a veterinarian in the service of the B. A. I.;

Dr. J. S. Grove, inspector in charge of the B. A. I. at Oklahoma City gave an address for the uplifting of the veterinary profession, which was beneficial to all who were present;

Dr. Fred Eagle in an interesting talk discussed the betterment of the profession;

Doctors F. F. Meades, A. O. Hughes, J. M. Vrba, E. M. Prather, J. E. May, W. F. Hall, J. A. Lowell, F. M. Starr took part in the various discussions.

R. C. SMITH, Secretary.



CONNECTICUT VETERINARY MEDICAL ASSOCIATION

The annual meeting of the Connecticut Veterinary Medical Association was held at the Hotel Garde, in Hartford, on Tuesday, February the first.

Eighteen members were present and the following officers were elected: President, Dr. G. E. Corwin, of Canaan; First Vice-President, Dr. G. L. Cheney, of New Haven; Second Vice-President, Dr. F. D. Monell, of Derby; Secretary, Dr. A. T. Gilyard, of Waterbury; Treasurer, Dr. Thos. Bland, of Waterbury.

Doctors J. S. and E. F. Schofield of Greenwich invited the association to their town for its next summer meeting.

This invitation was accepted with much enthusiasm and several papers were promised. The secretary was instructed to confer with the Schofields regarding the date of the meeting as well as the program. The members present entered into a very interesting and lively discussion of cases, and everybody seemed to be willing to talk, and the afternoon slipped away very quickly.

Dr. Bland passed around copies of a booklet containing a copy of the Veterinary Practice Laws of Connecticut and a list of the veterinarians licensed to practice in the state. This pamphlet has been compiled for the association by Dr. Bland and copies of it may be had upon application to the secretary.

A. T. GILYARD, Secretary.

COMMUNICATIONS

A VETERINARY EMBLEM

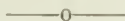
Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

DEAR SIR: Some two years ago the Rockland Co. N. Y. Veterinary Association suggested to the American Veterinary Medical Association the importance of adopting a distinctly veterinary emblem that might be used on vehicles or in miniature be worn as a pin. The blue cross was also suggested as the emblem.

The subject was carefully considered and much data regarding the cost as well as suggestions as to the form and colors to be used were taken to the Oakland meeting. At Oakland a communication was received from a prominent army veterinarian, stating that an international conference was to be held at Bern in the near future to adopt an international veterinary emblem for the protection of horses in war. The writer also stated that it was quite certain that the emblem adopted would not be a blue cross, as to most veterinarians the blue cross is the emblem of the British Society for the Prevention of Cruelty to Animals.

In view of this information, it was thought best to postpone the consideration of the subject until the international congress has adopted what may be called an universal emblem.

N. S. MAYO.



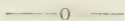
ILLEGAL PRACTICE

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

DEAR SIR: Thinking that reports of prosecutions of illegal practitioners might be regarded as news items of interest, I send you the following which you may publish in the next *Journal* if you see fit:

H. M. Cleaves, who claims to be a veterinary surgeon, and who has been practicing in Norfolk, Va. and vicinity, was recently arrested and tried before a Justice of the Peace, who fined him fifty dollars and cost, in default of which he was sent to jail.

Respectfully yours, H. BANNISTER, Sec'y.



Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

DEAR SIR: In relation to the case report in the February number under the head of "What Was This Trouble?" by Dr. Walter M. Pendergast of Syracuse, N. Y. I would suggest that it reads very much like an outbreak of anthrax in cattle partially immune. Partial immunity might have been brought about by the cattle being native to anthrax soil or by vaccination.

The symptoms—excessive temperature, suppressed and bloody milk secretion, dark feces, and the history—inundated pasture and the fact that cattle kept in the stable escaped, to me points strongly to anthrax.

R. W. GANNETT,
74 Adams St., Brooklyn.

Editor of the Journal of the American Veterinary Medical Association, Ithaca, N. Y.:

The December and January numbers of your Journal afford very interesting reading, to both the profession and stock owners; to all, in fact, who are interested in the detection and suppression of contagious diseases in the animal kingdom.

The articles are particularly interesting to me, as one who acted as veterinary inspector under the British Government in the North of Scotland, for the County of Inverness, where, in the years 1872-3, there was more than one outbreak of epizootic aptha, (commonly called foot-and-mouth disease,) in both the bovine and ovine tribe.

In the recent outbreak in the United States, referred to in said articles, it is beyond my ken how this disease, with its specific symptoms, could, for one week, baffle the profession in its diagnosis, especially since this was not the first outbreak in this country: the delay thus occasioned causing tremendous unnecessary expense to the federal government, in the final stamping out of the disease.

To me, this seems a remarkable lack of professional knowledge, allowing the plague to get sixteen days headway, without recognition.

The abnormal temperature and depressed condition in the latent period of foot-and-mouth disease, is always the forerunner, without visible lesions, and isolation for four days in the first cases suspected, if an error, would at least be an error on the safe side. In my opinion, the symptoms should have been recognized at once.

This being a specific disease, it has a latent period, in my experience, of only four days: an incubative period of less than twelve days, and a special appointing period, certainly within fourteen days. I need not go over the physical symptoms of these periods, but they are conclusive and of a specific character.

I certainly agree with the energetic measures taken by the federal government in the quarantine and general slaughter, in all affected areas, and the extreme care exercised in disinfecting every possible means of transmitting the contagion, and indeed the crow, black though he be, could be painted a little blacker because of the part he plays in carrying the germs of this scourge.

In my experience in handling this disease in Scotland, I never knew a case to end fatally, in either the bovine or the ovine tribe. Its lesions are limited to all mucous membranes, with a temperature

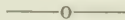
up to 106 : difficulty in mastication, deglutition and rumination : with a profuse dripping of saliva, resulting in a peculiar smacking of the lips. These are specific symptoms of the disease, and I have known animals to reduce in weight from 600 pounds to 400 pounds. But the convalescent period is short, within two months the animal will regain its normal weight, under favorable conditions, unless there are serious foot lesions, which may assume a chronic character. I mean in the bovine and ovine.

We did not, in the North of Scotland, resort to the slaughtering process, or even the strict quarantine, as at that time, the movement of animals in that district was very limited, and as a rule, within six weeks the epizootic ceased to exist. I am recording this from personal observation while acting as government inspector in that country.

I can understand the complications existing in this country between the federal and state veterinary departments, and can illustrate the indifference of the veterinary department of the State of New York, by the following condition : Why was bovine pleuro-pneumonia allowed to ravage the whole of Long Island for ten years, before it was detected and stamped out by a private practitioner? You will admit that this deserves an answer from the veterinary staff of the agricultural department of the State of New York.

It is bad surgery to try to heal up a wound while a foreign body remains in it. I am induced to offer the above remarks in the belief that I am the only veterinary surgeon, at least in the United States, who had full government supervision and handling of this malady before the stamping out process was ever thought of, some fifty years ago.

L. McLEAN, M. R. C. V. S.



REVIEWS

INFECTIOUS DISEASES OF ANIMALS AND THEIR CONTROL IN WAR

PROF. HERMANN MIESZNER, Hanover, Germany
162 pages and 37 illustrations. Published by M. H. Schapper, Hanover, 1915

The author, who is Professor and Director of the Department of Hygiene of the Royal Veterinary High School, in Hanover, Germany, endeavored to treat this subject in a most practical way, free from unnecessary theories, yet from a purely scientific point of view. He divided the subject into two parts, general and special. The general part describes the field hospitals and depots for horses, the moving laboratories for serological examinations behind the

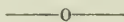
battle fronts, and finally a thorough chapter devoted to disinfection. The special part deals with the symptomatology, pathological anatomy, symptomatic therapy, serum, vaccine and chemotherapy of the different infectious diseases, such as glanders, anthrax, rabies, scabies, influenza, strangles, coryza, dourine, contagious pleuropneumonia of cattle, peripneumonia bovum, and rinderpest. The use of salvarsan and arsinosolvin is described in detail.

Special attention is given to the differential diagnosis of various diseases. The routine laboratory tests, and the various biological tests applied to animals for diagnostic purposes are well described and illustrated. The illustrations picturing the ophthalmic reaction are especially noteworthy.

This work now occupies a unique place in veterinary literature since it represents the first publication which describes the ways and means by which it is aimed to control animal plagues under such unfavorable conditions as exist during the present conflict.

The author has certainly treated this important subject very thoroughly, and the volume deserves careful attention, especially by the veterinary sanitarians.

EICHHORN.



ESSENTIALS OF VETERINARY LAW

HENRY BIXBY HEMENWAY, A.M., M.D.

Fellow, American Academy of Medicine; Fellow American Medical Ass'n, etc.
Published by the American Journal of Veterinary Medicine, Chicago, Ill., \$3.00.

This volume of 340 pages is published as No. 10 in the Veterinary Medicine Series. The author states there has been a request for a handbook which could be used as a text in veterinary schools and agricultural colleges. The perfunctory way in which veterinary jurisprudence has been taught in many of the veterinary schools and the absence of such instruction in many of the agricultural colleges, would indicate that such a book is of timely interest, not merely as a text book but as a book of reference for the many who have passed through college without adequate information on this subject.

The book has been divided in four parts including ten chapters. Part I deals with fundamental and general legal principles as a

basis for the more specific principles applicable to veterinarians and agriculturalists.

Part II appertains more particularly to veterinary practice. Information is given relative to the authority of the state; license to practise; revocation of license; what constitutes veterinary practice; veterinary contracts; errors of judgment; liabilities for the acts of others; cases of malpractice, liability for accidents; liability for operation; right to sue for fees; amount of compensation; liens; expert testimony, etc.

Part III deals more particularly with veterinarians, in the government service. Their jurisdiction and authority as officers are discussed especially with reference to quarantine, destruction of property, appraisement and liability for infectious diseases, etc. Another chapter deals with dairy inspection, dairy products; the meat industry, including transportation of live stock, quarantine regulations, supervision of slaughter houses, ante and postmortem examinations, meat inspection, etc. A few pages are also devoted to biologic products.

Part IV pertains to animals generally. A chapter is devoted to the ownership of animals and another to bailment. This section has much legal information, especially for the agriculturalist but also of use to the veterinarian. A number of pages is devoted to the citation of cases. Following a complete index is a short chapter on Collecting by Mail, by W. B. Parker.

Although the summary given above is incomplete, it is sufficient to indicate the general scope of the work. Veterinarians should have a more extended knowledge of their rights, liabilities and responsibilities; they should know enough of the legal aspects of the live stock industry to be of service to advise and co-operate with their agricultural clients. Heretofore this knowledge has not been easily obtainable in concise form. The present book meets this need.

P. A. F.

NECROLOGY

JAMES H. FERSTER

Dr. James H. Ferster was born in the State of New York sixty-three years ago, March 2, 1853. As a young man he located at Rochester, N. Y., where he was engaged in the advertising business, later going to New York City, where for a number of years he was on the staff of the New York Sun.

Following his newspaper experience, Dr. Ferster practised as a veterinary physician and surgeon in Plainfield, N. J., and then moved to New York City, where he has since engaged in veterinary practice. He was graduated in this state March 4, 1890, and for a number of years lectured in the New York College of Veterinary Surgeons on canine pathology.

He was a member of the New York Driving Club, the R. D. A. N. Y., and the Nassau Driving Club, serving as president of the two former clubs in 1914, and he also was a prominent factor in the recently organized New York State Association of Horsemen.

Dr. Ferster was taken with pneumonia, but within a few days was reported to be on the road to recovery. He suffered a relapse, however, and all efforts to check his decline were unavailing. He leaves one son, Charles Ferster. Dr. Ferster was a great friend to little children. A few weeks before his death, Dr. Ferster published, in the Trotter and Pacer, the following lines:

I place one hand in God's and then I know
I cannot fall; and then as far below
As I can reach, I stretch my other hand
And in the slum and depth of wickedness I find
A fallen fellow man. I shout "Hello!
'Tis Christmas morn—look not below
But up." I grasp his hand and hold it tight
As mine is held by Thee, and pray for might
To help me put his trembling hand in Thine.
Then Thou wilt draw him by Thy power divine
Unto Thyself. Then he, like me, will stand
One hand in thine; the other stretched toward man.
For he can reach some man that I cannot.
He knows some tender chord I have forgot.
And as I see him lift, and place some other's hand
In Thine, I quietly give thanks that Thy great plan
For saving man is through his fellow man.
Give thanks for more: Give thanks that God saw fit
In saving men to let me help a bit!

D. ARTHUR HUGHES


David Arthur Hughes died at Chicago, February 14, from an attack of grippe, followed by pneumonia, with heart complications, at the age of forty-six. Dr. Hughes was born in Liverpool, England and came to America at the age of fourteen. He graduated at Cornell University, specializing in literature and later returned to specialize still further and to obtain an advanced degree. He was a winner of a Shakespearean prize. He graduated from the New York State Veterinary College at Ithaca, N. Y., with the class of 1903, and was married in 1907.

For a number of years Dr. Hughes has been Inspector of Food Supplies for the Quartermaster's Corps, United States Army at Chicago. He was also Professor of Dairy Inspection, Milk Hygiene and Medical Botany, at the Chicago Veterinary College and editor of the *Quarterly Bulletin*.

Dr. Hughes was a voluminous writer. His signed articles were frequently seen in English and American veterinary, agricultural, medical and secular magazines. His interest in literature and veterinary affairs was profound and the profession suffers a decided loss in his untimely end.

DANIEL B. ERB

Dr. Erb died of heart failure last January at the age of 86 years. He was a resident of East Petersburg, Pa., and had practised farming and veterinary medicine for many years, although of late he had retired from active work. He is survived by five children, twenty-two grandchildren and ten great-grandchildren.



MISCELLANEOUS

CHRISTIAN CO-OPERATION IN FOOT-AND-MOUTH DISEASE: According to Wallace's Farmer, a case of foot-and-mouth disease broke out again on January 17, in Christian County, Ill., and another case was discovered January 28. The farmers took prompt action. A mass meeting was held at the county seat. Representatives were present from every township in the county. A county live stock organization was effected and a circular letter was sent to more than two thousand farmers in the county, telling them of the danger, and of the part it would be necessary for them to play to stamp out the disease. Visiting back and forth promptly went out of fashion, dogs were destroyed or confined at home. Peddlers and subscription solicitors were put out of business at once. On a large number of farms, cans containing disinfectants were installed near the gates, and farmers and their families disinfected their shoes when leaving home and again when returning. There were no appeals to the court, no political oratory, no foolishness of any kind. Everybody joined in doing what experience has shown to be necessary to stamp out the disease. [We trust there are other Christian Counties where this spirit of co-operation will prevail in time of need.]

The Utah Agricultural College at Logan has included in its short extension courses, one for veterinarians which has proved of much interest.

At the meeting of the Michigan State Veterinary Medical Association held at Lansing, Mich., Dr. George W. Dunphy was elected president.

The eleventh annual meeting of the Ohio Valley Veterinary Medical Association was held at Terre Haute, Ind., February 9. About 150 members were in attendance from Indiana, Illinois, Ohio and Kentucky. A very successful meeting was reported. At the banquet, Dr. D. M. Campbell of Evanston, Ill., officiated as toastmaster.

The State Board of Agriculture of Rhode Island has issued regulations that any person or firm bringing into the state for selling or using anti-hog cholera serum, virus of hog cholera, tuberculin, mallein or other biological products used for testing or

immunizing domestic animals must first obtain permission from the State Veterinarian.

The sale of such products with the amount sold must also be reported.

Persons procuring such products must not use or dispose of them until assured that a report of such delivery has been made to the State Veterinarian or until they themselves have made such a report. [It is conceivable that in some urgent cases such a delay may cause rather serious consequences.]

If the virus of hog cholera is used in the state, it must be under the supervision of the State Veterinarian.

No animal that has reacted to the tuberculin, mallein or blood test shall be removed from the premises where the test was made without permission from the State Veterinarian. Any person making the test for tuberculosis or glanders must immediately notify the State Veterinarian of the result of such test.

A fine of \$300 is imposed for violating the regulations.

The next meeting of the Schuylkill Valley Veterinary Medical Association will be held at 25 North Sixth Street., Reading, Pa., June 14.

Dr. W. F. Burleigh, formerly of Oneida, N. Y., is assistant state veterinarian at Clemson College, S. C.

The next annual meeting of the Texas Veterinary Medical Association will be held at Fort Worth, Texas, March 14 and 15.

The Northwestern Ohio Veterinary Medical Association met at Toledo, Ohio, February 16.

Army Veterinarian Charles H. Jewell, at Fort Sill, Oklahoma, will be stationed at Schofield Barracks, Honolulu, H. I. He expects to sail from San Francisco March 6.

The California State Veterinary Medical Association will meet March 8, at Davis, Cal.

The Veterinary School at Munich, Germany, has become a part of the University.

More than one-tenth of the Salmon Fund has been subscribed.

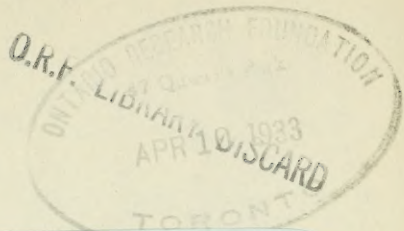
The practice of the late Dr. Ferster will be continued by Dr. R. S. MacKellar who has been associated with him for over 21 years.

VETERINARY MEDICAL ASSOCIATION MEETINGS

In the accompanying table the data given is reported by many Secretaries as being of great value to their Association, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list:

Name of Organization	Date of Next Meeting	Place of Meeting	Name and Address of Sec'y
Alabama Vet. Med. Ass'n..	1916 Feb. 18-19	Auburn	C. A. Cary, Auburn
Alumni Ass'n College of Vet Med. O. S. U.		Columbus.....	W. R. Hobbs, care O. S. U., Columbus, Ohio.
Alumni Ass'n, N. Y.-A. V. C	1916	141 W. 54th St.	P. K. Nichols, Ft. Richmond.
Alumni Ass'n U. S. Coll. Vet Surgeons	April 15, 1916..	Wash., D. C....	C. M. Mansfield, Wash., D. C.
American V. M. Ass'n....	1916 Aug. 22-25	Detroit, Mich...	C. M. Haring, Berkeley, Cal.
Arkansas Veterinary Ass'n	1916	Little Rock....	R. M. Gow, Fayetteville.
Ass'n Médéciale Veterinaire Française "Laval"	1st and 3d Thurs of each mo.	Leec. Room, La Val Un'y, Mon	J. P. A. Houde, Montreal
B. A. I. Vet. In. A., Chicago	2d Fri. each mo	Chicago	Chas. E. Schneider, Chicago.
B. A. I. Vet. In. A., S. Omaha	3d Mon. each mo	S. Omaha, Neb.	E. J. Jackson, So. Omaha.
Buchanan Co. Vet. Ass'n..	Monthly	St. Joseph.....	F. W. Caldwell, St. Joseph, Mo.
California State V. M. Ass'n	March 8, 1916..	Davis	F. M. Hayes, Davis.
Central Canada V. Ass'n....	Feb. and July..	Ottawa	A. E. James, Ottawa.
Central N. Y. Vet. Med. Ass'n	June and Nov..	Syracuse.....	W. B. Switzer, Oswego.
Chicago Vet. Society.....	2d Tu. each mo	Chicago	D. M. Campbell, Chicago.
Colorado State V. M. Ass'n.	June, 1916....	Fort Collins...	L. E. Newsom, Ft. Collins.
Connecticut V. M. Ass'n....	1916	Greenwich.....	A. T. Gilyard, Waterbury.
Delaware State Vet. Society	Jan. Ap. Jul. Oct	Wilmington ...	A. S. Houchin, Newark, Del.
Essex Co. (N. J.) V. M. A..	3d Mon. each mo	Newark, N. J..	J. F. Carey. E. Orange, N. J.
Genesee Valley V. M. Ass'n	.....	Rochester	O. B. Webber, Rochester.
Georgia State V. M. A....	1916	Savannah.....	P. F. Bahnsen, Americus.
Hamilton Co. (Ohio) V. A...	.....	.....	Louis P. Cook, Cincinnati.
Hudson Valley V. M. A....	.....	Hudson	W. H. Kelly, Albany.
Idaho Ass'n Vet. graduates.	1916 Feb. 3-4..	Blackfoot	J. R. Fuller, Weiser.
Illmo Vet. Med. Ass'n.....	1916	E. St. Louis....	J. B. Michael, Collinsville, Ill.
Illinois State V. M. Ass'n...	1916	Chicago	J. A. Merillat, Chicago.
Indiana Veterinary Ass'n...	1916	Indianapolis ...	A. F. Nelson, Indianapolis.
Iowa Veterinary Ass'n....	1916	Des Moines.....	L. B. Treman, Rockwell City.
Kansas State V. M. Ass'n.	Jan. 23, 1917.	Wichita	J. H. Burt, Manhattan.
Kentucky V. M. Ass'n.....	Oct. & Feb....	Lexington	Robert Graham, Lexington.
Keystone V. M. Ass'n.....	3d Tu. each mo	Philadelphia ...	Heston M. Hoskins.
Lake Frie V. M. Association	Pending	Pending	Phil. H. Fulstow, Norwalk, O.
Louisiana State V. M. Ass'n.	1916	Lake Charles ...	Tamlet Moore, N. Orleans, La.
Maine Vet. Med. Ass'n....	1916	Augusta	H. B. Westcott, Portland.
Maryland State Vet. Society	.....	Baltimore	H. H. Counselman, Sec'y.
Massachusetts Vet. Ass'n...	th Wed. ea. mo.	Young's, Boston	E. A. Cahill, Lowell, Mass.
Michigan State V. M. Ass'n.	1916	Lansing	W. A. Ewalt, Mt. Clemens.
Minnesota State V. M. Ass'n	.....	St. Paul	J. Ed. Leech, Winona.
Mississippi State V. M. Ass'n	1917 Jan. 10, 11	Clarksdale	E. S. Norton, Greenville.
Mississippi Valley V. M. Ass'n	Semi-Annually	Galesburg, Ill..	J. E. McIntyre, Alexis, Ill.
Missouri Valley V. Ass'n....	1916 Feb. 1, 2, 3	Kansas City, Mo	R. F. Bourne, Kansas City, Mo.
Missouri Vet. Med. Ass'n...	1916	St. Louis.....	Chas. D. Tulse, Kansas City.
Montana State V. M. A....	1916 Jan. 28, 29	Bozeman	A. D. Knowles, Missoula.
Nat'l Ass'n B. A. I. Employees	1916	New York, N. Y.	S. J. Walkley, 185 N. W. Ave., Milwaukee, Wis.
New York S. V. M. Soc'y...	1916 Aug. 2-4..	Ithaca	J. P. Fitch, Ithaca, N. Y.
North Carolina V. M. Ass'n.	1916	Wilson	J. P. Spoon, Burlington.
North Dakota V. M. Ass'n.	1916 July	Fargo	W. J. Mulroony
North-Western Ohio V. M. A.	1916	Toledo	Paul E. Woods, Ottawa
Ohio State V. M. Ass'n....	Jan. 13-14, 1916	Columbus	F. A. Lambert, care O. S. U., Columbus, Ohio.
Ohio Soc. of Comp. Med....	Annually	Upper Sandusky	T. F. Sheets, Van Wert, Ohio.
Ohio Valley Vet. Med. Ass'n	.....	.....	J. C. Howard, Sullivan.
Oklahoma V. M. Ass'n.....	Fall. 1916....	Omaha City....	J. E. Steel, Oklahoma City.
Ontario Vet. Ass'n.....	1916	Toronto	L. A. Wilson, Toronto.
Pennsylvania State V. M. A.	1916 Feb. 22-23	Pittsburgh	E. H. Yunker, Philadelphia



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